

TOP 20 PCs FOR HOME AND OFFICE • NEW TOP 10 PERSONAL PRINTERS

INTRODUCING
PC WORLD @HOME

PC WORLD

August 1995 \$4.95

THE COMPLETE UPGRADER'S GUIDE

WINDOWS 95

- ▶ What Works, What Doesn't
- ▶ The Scoop on Plug and Play
- ▶ First Performance Tests
- ▶ What Real Users Found
- ▶ New 32-Bit Applications
- ▶ Help—The Best Ways to Get It

**JUST WHAT
YOU'VE WAITED FOR.
A NOTEBOOK
YOU DON'T HAVE
TO WAIT FOR.**



EPA POLLUTION PREVENTER



pentium
PROCESSOR



YTDSALES.WK1

MARKETING DIST	REGION	STATE	TOTAL	URBAN	RURAL
12	12		25,413	9,399	
40			8,430	3,119	
17			45,424	16,061	
52			7,075	2,617	
14			65,126	24,088	
12			5,845	2,165	
23			5,565	2,232	
14			5,005	1,708	
78			5,019	1,056	
41			47,991	17,750	
65			35,400	13,463	
7			1,882	96	
1			12,250	4,31	
4			57,104	21,120	
38			37,402	15,634	
75			16,919	6,257	
47			25,579	9,888	
24			23,451	8,673	
67			16,215	6,182	
92			30,440	11,259	
83			4,371	1,616	
53			51,945	18,311	
98			30,584	11,512	
94			14,347	5,307	
47			15,839	5,858	
7			46,085	17,044	
67			30,125	11,132	
49			55,545	19,804	
6,617			6,290	2,327	
15,376			11,216	4,152	
19,518			1,229	5,286	

ANNUAL MARKETING RESULTS

STOCK UPDATE - NEW YORK 10:17 A.M. - TUESDAY DEC 13 1994

DocB...	MEN...	YUBS...	BIBAY...	BWQF...	IJM...	HSTS...	BaHAts...	Velys...
27.23	13.5	231.65	3.4	19.312	.61	101.7	.9651.23	1032.54

Region	Total	Urban	Rural
New England	270,389	352,041	1,783,104
Mid-Atlantic	150,271	182,190	913,802
Texas	63,217	46,148	17,069
Southwest	13,162	9,831	4,637

Now you can slice through those mega spreadsheets, speed through your compute-intensive CAD/CAM applications and

**Now
with 10.4"
Display**

create truly professional, full-motion, multimedia presentations, thanks to the new NEC Versa™ P. With its 75MHz Pentium™ processor, the Versa P is more than 100% faster than the equivalent Intel 486™ system. And we've fine-tuned the performance with 256K of secondary cache. So it has the horsepower to race through programs that used to crawl on

the first screen of its kind on a notebook computer. This breakthrough technology lets you take the equivalent of a desktop SVGA display with you on the road. The VersaVision High-Resolution display lets you see 56% more than other notebooks. That's 56% more spreadsheet columns, 56% more for windows, and 56% more for useful tools and icons. All so you can do more work faster than ever before.

Of course, the Versa P offers the quality, reliability and support you expect from

with our free courier service.

So what are you waiting for? Find out more about the

75MHz Intel Pentium processor, 256K secondary cache

8 MB RAM; expands to 40 MB, Up to 810 MB hard disk

Choice of active-matrix TFT color displays: High-Resolution 800 x 600, Enhanced 640 x 480 with 64K colors

Reversible, removable screen

Indeo™ compression for full-motion video

Built-in 16-bit Sound Blaster® compatible sound system

Audio jacks for headphone/speakers and microphone

Versa Docking Station™ II and Multimedia CD Dock options

2 Type II PCMCIA slots, or 1 Type III slot

VersaBay™ for additional PCMCIA and expansion options

Plug and Play ready for Windows™ 95

anything but a desktop system.

But that's just half the story. Because the Versa P has NEC's exclusive

VersaVision™ High-Resolution 800 x 600 TFT color screen*



Why settle for what's inside the dotted lines? See 56% more with the unique NEC VersaVision High-Resolution display.

puts help as close as the nearest telephone. And it's backed

NEC. That's why we offer an industry-leading 3-year limited warranty and UltraCare™ service program that

new NEC Versa P notebook. Just call us at 1-800-NEC-VERSA. Or see your favorite dealer today.

**SEE, HEAR
AND FEEL THE
DIFFERENCE™**

NEC

*Versa P has two display options: VersaVision High-Resolution 800 x 600 display or VersaVision full-color TFT with 64,000 colors. For information sent via fax, call NEC FastFacts™ at 1-800-366-0476 and request document #8377271. Versa, VersaBay, VersaVision, FastFacts and See, Hear and Feel the Difference are trademarks and UltraCare is a servicemark of NEC Technologies, Inc. The Intel Inside logo is a registered trademark and Indeo, Pentium and Intel 486 are trademarks of Intel Corp. All other trademarks and registered trademarks are the property of their respective owners. The Energy Star emblem does not represent EPA endorsement of any product or service. ©1995 NEC Technologies, Inc. NEC GSA #GS00K94AGS5241PS01.

**THE NEW NEC VERSA P
WITH PENTIUM
PROCESSOR POWER.**



Your idea of an office has changed. Your idea of great color hasn't.

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COLOR
BUBBLE JET
PRINTER

These days your office is likely to be wherever you happen to work. The bedroom. The boardroom. The backyard. And that work better be spectacular. So your

printer has to go everywhere you do, producing brilliant color and true black output that's absolutely top drawer.

That's the beauty of the BJC-70 Color Bubble Jet™ Printer from Canon. First, you get 720 x 360 dpi resolution (really crisp quality) and 4 page-per-minute laser speed in black and white. On top of that you get bright, vibrant colors.

All in one sleek, cool, economical little package.

But don't let the size fool you.

The BJC-70 auto-feeds 30 sheets at a time. And it's so rugged we offer a two-year limited warranty including free InstantExchange.

Naturally, it's as easy to use as it is to carry.

It even comes with our Color Advisor software that automatically picks the colors that make you look your best.

So give us a call at 1-800-848-4123, Ext. 444.

Because the BJC-70 Color Printer is going to be giving you all kinds of new ideas.



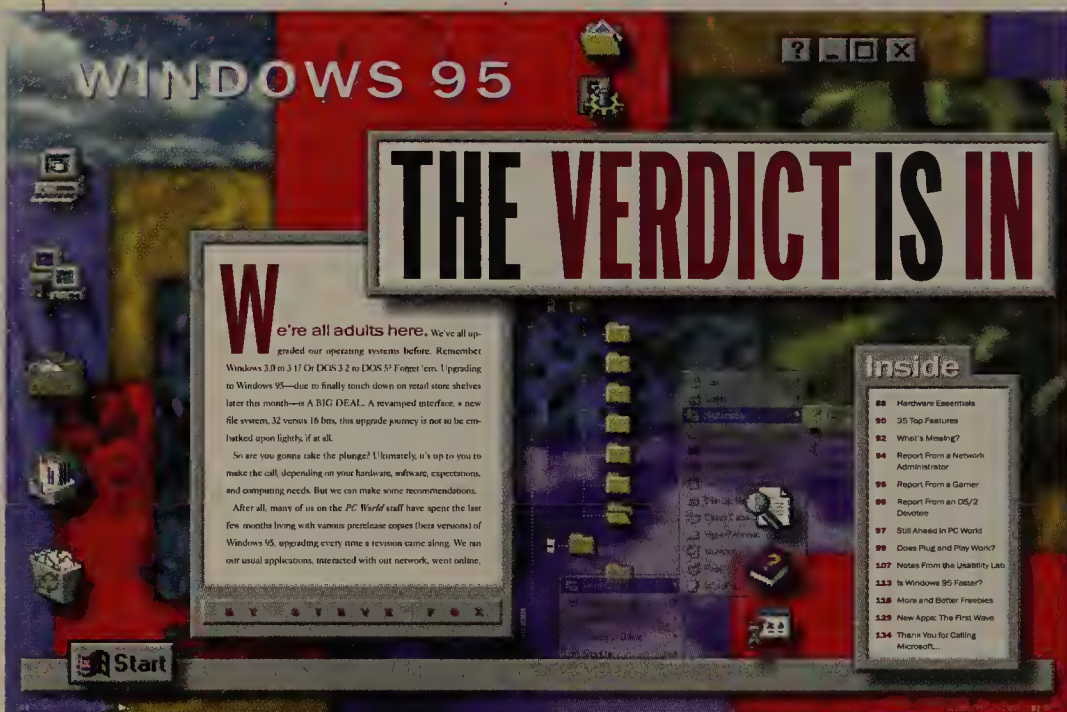
Feeds 30 sheets automatically.



Sharp, fast, brilliant colors and true blacks.

Canon

PC WORLD



Cover Story

86 Windows 95: The Verdict Is In

Leaving the ranks of vaporware at last, Windows 95 is now a real choice. An overhauled interface, 32-bit processing, and a new file system are among the issues facing potential upgraders. As Microsoft rolls out the most widely anticipated software release in years, these are our recommendations. Welcome to the operating system you've been waiting for.

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The short answer: With components that meet Plug and Play guidelines, absolutely. But with components that don't...

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Five typical computer users wrangle with Windows 95 and OS/2 Warp, two rival 32-bit operating systems. Who gets caught in the cross fire?

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32-bit apps and more RAM will maximize Windows 95 performance, but your 16-bit apps may actually run slower.

116 More and Better Freebies

Applets for file viewing, disk management, online services, and more.

129 New Apps: The First Wave

Win 95 apps' release dates; plus the 32-bit MS Office and Norton Utilities.

134 1-800-HELP!!!

Where to get tech support and how to avoid having to use it.

Cover Illustration by Jonas Höglund; Photography by Dennis Hallinan/FPG International

Presentation Software

143 Multimedia Is the Message

Once out of reach of the masses, multimedia capabilities are now built into nearly every presentation package on the market, with animation, video, music, and sound effects adding a Hollywood touch to proposals, project planning, and graphs. We rate three new packages built with multimedia in mind and see if five veteran contenders can upstage them.

Systems

160 Top 20 PCs: How Much Speed Do You Need?

As new Pentium-133 PCs climb to all-time highs in performance, PC buyers will have to plunk down a hefty chunk of change to own one. For the less power-crazed, the appearance of these speedsters brings a bonus: dropping prices on Pentium-100 and 120 PCs. This month's top Best Buys: Dell Dimension XPS P100c, Micron 4100 Magnum, Toshiba T4900CT, and WinBook XP SX-33 monochrome.



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Tips on using a PC to help your kids with homework.

328 Home Office

Automating the lights and appliances in the House of Bass.



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Graphics Boards

205 Top 10 Windows Accelerators: VL Boards Still Kicking

VL boards keep pace with the features and prices of comparable PCI cards.

Top 10 Printers

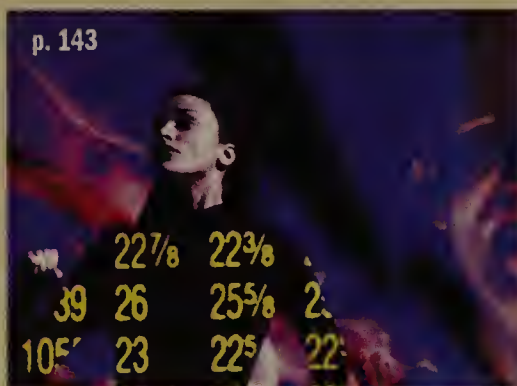
210 Personal Printers Get Professional

With outstanding text, vibrant color, and competitive performance, today's single-user printers are among the best bargains around. We review 16 laser and ink jet personal printers, priced as low as \$236. Plus, we introduce the first of *PC World's* new monthly Top 10 Printers charts, with the NEC Silentwriter SuperScript 610plus and the Canon BJC-600e winning Best Buys.

Reliability & Service Monitor

203 Win a Pentium-75 PC

How satisfied are you with your PC? Fax in this survey for a chance to win a Dell Dimension XPS P-75, a Best Buy PC from this month's Top 20 Budget PC chart.



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New Products

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| 41 AST Bravo MS P/133, Advantage Adventure 8133P, Premmia GX P/133; AT&T Globalyst 730; and USA Flex PT-133 systems | 46 GlidePoint Desktop touchpad | 59 WinWay Resume 3.0 job search CD-ROM |
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| 44 Okidata Okijet 2010 and OL810e printers | 52 Win '95 Advisor utility | 64 Carbon Copy 3.0 for Windows, CoSession 2.0 for Windows remote control software |
| 44 Epson Personal Document Station | 52 Common Ground 2.0 portable document software | 66 Instant Internet LAN-Internet access system |
| | 54 Alpha Four Version 6.0, DataEase 5 for Windows | 66 Journalist 3.0 for Windows online utility |
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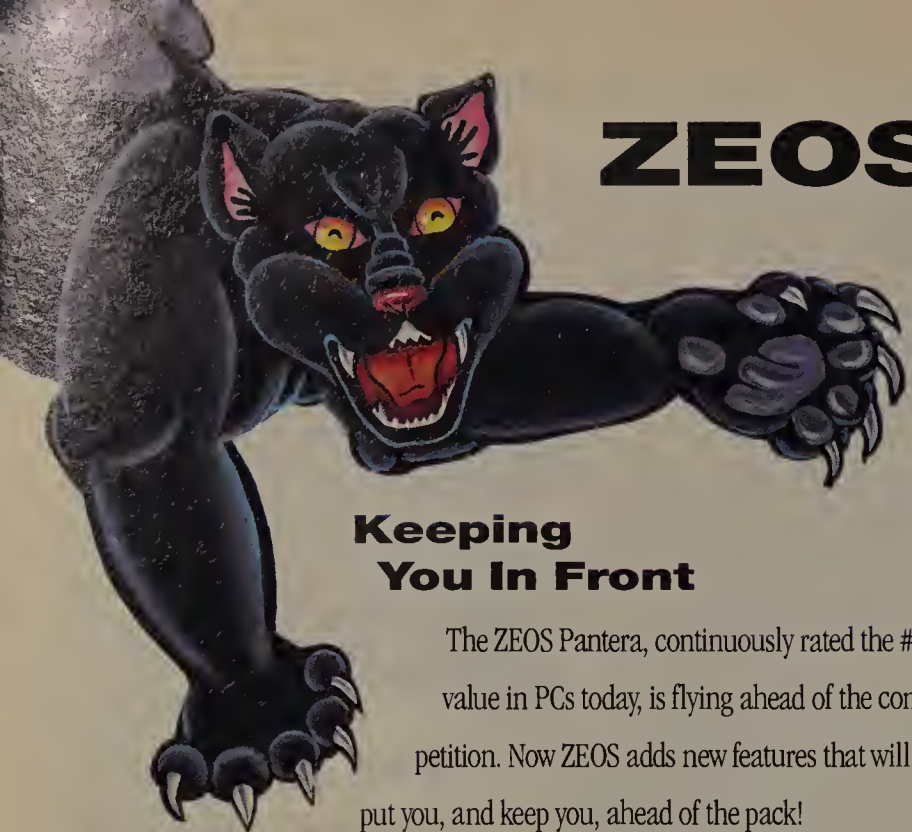
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ZEOS® Pantera™ Strikes Again!

Keeping You In Front

The ZEOS Pantera, continuously rated the #1 value in PCs today, is flying ahead of the competition. Now ZEOS adds new features that will put you, and keep you, ahead of the pack!

At ZEOS, we give you the best of everything. And that starts with performance. The heart of the Pantera is an award-winning ZEOS-designed motherboard. Already called "Overall performance leaders" by *PC Magazine*, the Pantera Pentium line is now boosted even further with the addition of EDO DRAM, synchronous burst SRAM cache options and CPU choices all the way to the brand new 133MHz Pentium processor. In plain English, we've turned on the afterburners—giving you performance unlike anything you've seen before!

Beyond great performance, we also protect your investment. To ensure

that your new ZEOS Pantera will serve you well for years to come, we build in more reliability, expandability and upgradability than anyone else.

For starters, all Pantera systems provide you with CPU upgradability—Pentium systems can even be upgraded to the future P6-based OverDrive Processor. Pentium-based systems include *six* memory sockets instead of the usual four. That means more room to grow—without having to throw away perfectly good memory when it's time to upgrade. Pantera Pentiums also include on-board PCI local bus SCSI and ethernet options and the power to run all these goodies. Believe it or not, most companies are now building in small power supplies of 150 watts or less! That's great for reducing *their* costs, but it sure doesn't do much for *you*. Pantera power supplies are 200 watts *standard* and they're energy efficient—most Panteras are EPA Energy Star compliant, meaning they can power down and use less energy.

The bottom line is that virtually no one else gives you any of these features to protect your investment. At ZEOS we give you them *all!*

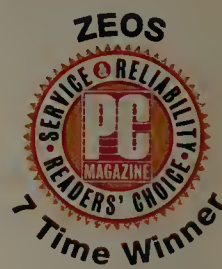
More Than Great Hardware

In addition to the latest features, you need your new system to arrive promptly and you need it to work when you get it. That is why ZEOS Pantera systems are compatible with every major operating system on the market including Win NT, Netware, Unix and OS/2. That is also why we pioneered our *Computers Now*® program—many of our most popular configurations can be shipped the *very day you order* (even custom-built systems can be shipped in about a week). You could be taking delivery of your new Pantera tomorrow!

And after your purchase, we'll be here. ZEOS was the first to provide 24 hour-per-day, 365 day-per-year toll-free technical assistance, and it's the best there is. Add to that our easy accessibility through the major on-line services and through our automated fax-back system, and you can see that we support you like no one else.

Unbeatable Value

The hottest performance for today and for tomorrow, compatibility, reliability, bundled software, the best service in the industry and incredible prices that'll leave you amazed at how much you get for so little. As *PC/Computing* said, the Pantera "... is a deal you simply can't pass up." So call your ZEOS Systems Consultant now at 800-554-5220. It's the best purchase decision you'll ever make.





Pentium-66
April 12, 1994
DX4-100
June 28, 1994



Pentium-60
April 1994
Pentium-90
August 1994



486DX2-66
January 1994
February 1994
March 1994
June 1994
Pentium-60
December 1994
January 1995
February 1995
March 1995
April 1995

DX4-100
October 1994
November 1994
December 1994

Pentium-60
December 1994
January 1995
February 1995
April 1995

Pentium-66
June 1994
July 1994
August 1994
September 1994

Pentium-90
August 1994
September 1994
October 1994
November 1994
January 1995
February 1995



Pentium-66
May 1994
Pentium-90
February 1995



Pentium-66
June 1994
Pentium-90
August 1994



Pentium-90
November 1994



Pentium-90
May 1995

Package 1		Package 2		Package 3		Package 4	
486DX2-66	\$1295	486DX2-66	CN! \$1595	486DX2-66	CN! \$2095	486DX2-66	\$2495
DX4-100	\$1445	DX4-100	\$1745	DX4-100	\$2245	DX4-100	\$2645
Pentium-75	\$1645	Pentium-75	CN! \$1945	Pentium-75	CN! \$2445	Pentium-75	\$2845
Pentium-90	\$1745	Pentium-90	\$2045	Pentium-90	CN! \$2545	Pentium-90	\$2945
Pentium-100	\$1895	Pentium-100	\$2195	Pentium-100	\$2695	Pentium-100	CN! \$3095
Pentium-120	\$2145	Pentium-120	\$2445	Pentium-120	\$2945	Pentium-120	CN! \$3345
Pentium-133	\$2395	Pentium-133	\$2695	Pentium-133	\$3195	Pentium-133	\$3595
<ul style="list-style-type: none"> ➤ 4MB RAM (Pentiums incl. EDO) ➤ 528MB local bus EIDE hard drive, 14ms ➤ 3.5" 1.44MB floppy disk drive ➤ Diamond Stealth 64 PCI local bus SVGA color graphics card with 1MB DRAM ➤ ZEOS 14" 1024 x 768 NI SVGA color monitor, .28mm ➤ Six-bay desktop case with two cooling fans ➤ Microsoft Mouse ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ MS Works 		<ul style="list-style-type: none"> ➤ 8MB RAM (Pentiums incl. EDO) ➤ 850MB local bus EIDE hard drive, 11ms ➤ 4X CD-ROM drive and 3.5" 1.44MB floppy drive ➤ Diamond Stealth 64 PCI local bus SVGA color graphics card with 1MB DRAM ➤ ZEOS 14" 1024 x 768 NI SVGA color monitor, .28mm ➤ Six-bay desktop case with two cooling fans ➤ Microsoft Mouse ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ MS Works Multimedia CD 		<ul style="list-style-type: none"> ➤ 16MB RAM (Pentiums incl. EDO) ➤ 1GB local bus EIDE hard drive, 12ms ➤ 4X CD-ROM drive and 3.5" 1.44MB floppy drive ➤ Diamond Stealth 64 PCI local bus SVGA color graphics card with 1MB DRAM ➤ ZEOS 15" 1024 x 768 NI SVGA color monitor, .28mm ➤ Six-bay desktop case with two cooling fans ➤ Microsoft Mouse ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ MS Office Pro & Bookshelf CD 		<ul style="list-style-type: none"> ➤ 24MB RAM (Pentiums incl. EDO) ➤ 1.2GB local bus EIDE hard drive, 10ms ➤ 4X CD-ROM drive and 3.5" 1.44MB floppy drive ➤ Diamond Stealth 64 PCI local bus SVGA color graphics card with 1MB DRAM ➤ ZEOS 15" 1024 x 768 NI SVGA color monitor, .28mm ➤ Six-bay desktop case with two cooling fans ➤ Microsoft Mouse ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ MS Office Pro & Bookshelf CD 	

Included With Every ZEOS Pantera:

- Genuine Intel® Processor. ZIF socket for easy upgrading.
- Diamond Stealth PCI local bus SVGA color graphics card with 1MB DRAM, upgradable to 2MB DRAM.
- Flash BIOS for easy upgrading.
- Two high-speed serial ports and one enhanced parallel port on the motherboard.
- Slots: Three PCI & 4 ISA (486), 3 PCI & 5 ISA (Pentium).
- ZEOS 101-key space-saving keyboard.
- 200 watt power supply with built-in surge suppressor. Switchable between 115/230V.
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- Complete ZEOS Customer Satisfaction Package.



pentium
PROCESSOR

486 & DX4:

- Upgradable to Pentium OverDrive CPU.
- RAM expandable to 128MB.
- EPA Energy Star compliant.

Pentium™:

- Upgradable to future P6-based OverDrive CPU.
- 6 SIMM slots for low-cost memory upgrading. EDO RAM expandable to 384MB.
- On-board PCI local bus Fast SCSI-2 and Ethernet LAN options.
- EPA Energy Star compliant (75, 90 & 100).

Pentium-133
Shipping
Now!

Favorite Options

- 7-Bay Mini-tower Case Upgrade..Free**
- 10-Bay Vertical Case Upgrade.....\$95**
- 1GB to 1.2GB Hard Drive Upgrade\$95**
- 528MB to 1GB HDD Upgrade.....\$150**
- 1MB to 2MB Video DRAM Upgrade\$59**
- Diamond Stealth 64 Video PCI Graphics Card with 2MB VRAM**
Fastest 64-bit accelerated video**\$249**
- Upgrade from a 14" to a 15" Monitor**
ZEOS SVGA NI, 1024 x 768, flat screen.....**\$95**

- Upgrade from a 15" to a 17" Monitor**
ZEOS SVGA NI, 1280 x 1024, flat screen.....**\$295**
- Internal 14,000 bps V.32 bis Modem with 14,400 bps Send/Receive Fax\$79**
- Internal 28,800 bps V.34 bis Modem with 14,400 bps Send/Receive Fax\$199**
- SCSI Controller Chip**
For on-board SCSI. Includes drivers.....**\$49**
- ZNYX EtherAction™ 32**
32-bit PCI Ethernet LAN adapter. Includes 10Base5, 10Base2 and 10BaseT connections.....**\$129**

- Front Drive Bay PCMCIA SwapBox**
Installs into 3.5" drive bay. 2 Type II, or 1 Type III and 1 Type II**\$179**
 - T1000 Internal Tape Backup**
400 to 800MB (with compression), includes backup software.....**\$199**
 - Multimedia Upgrade**
Sound card and stereo speakers**\$128**
 - Microsoft® Office Pro & Bookshelf® Upgrade From MS Works**
Two CD-ROMs with online documentation**\$149**
- Many other affordable upgrades and options available. Call for details!*

New! Free Microsoft® Software!



All Pantera packages include MS-DOS 6.22 and Windows for Workgroups 3.11. Packages 1 & 2 include Microsoft Works (on CD or diskettes). Packages 3 & 4 feature Microsoft Office Pro—Word, Excel, PowerPoint®, Mail and Access®—& Bookshelf®. (Documentation online.)

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Purchase orders are subject to approval. Business leasing programs available. All prices, specifications and availability are subject to change without notice; call to confirm these and warranty details. Prices do not include shipping. Novell compatibility is Developer Tested Only. Novell makes no warranties with respect to this product. All products and company names are trademarks or registered trademarks of their respective holders. Intel Inside and Pentium Processor Logos are trademarks of Intel Corporation. ZEOS is a registered trademark. Computers Now! is a registered servicemark. Z-Card is a servicemark. Pantera is a trademark of Micron Electronics, Inc. ©1995 MEI ZEOS, 1301 Industrial Blvd. Minneapolis, MN 55413 USA. Micron Electronics, Inc. is a publicly traded company (NASDAQ symbol: MUEI). PAN-PCW-9508

ZEOS Meridian™ Notebooks...



Meridians with unretouched photos of active matrix displays.

Top-Notch **Speed Demons.**

Vrooom! ZEOS Meridian notebooks are setting the pace—racing through application after application. They're swift and powerful. They're the *Indysputable* performance champs.

And they just got faster! Added to our already speedy Meridian line is the ZEOS Meridian 850 notebook featuring a Pentium processor up to 90MHz.

While each Meridian product is distinct, they all have several hot features that add to their impressive speed and ease of use including local bus video; a comfortable palm rest with an integrated TruePoint pointing device; and an 84-key keyboard.

Meridian 400 Subnotebook



"ZEOS is out to prove that good things do come in small packages with its Meridian 400C subnotebook," reported *Windows Magazine*.

At 3.9 pounds, the Meridian 400 is molded with a special carbon-fiber material that cuts weight and improves durability. And with your choice of a 486DX2-50 or DX4-100 processor, hard drives to 350MB, and RAM that's user upgradable to 20MB, this notebook is "faster than a speeding

desktop," as *Computer Shopper* said.

The 400 features active and dual-scan color screen options. You also get two Type II PCMCIA slots and an external ultra-light 3.5" 1.44MB floppy drive (included in Packages 2 and 3).

Meridian 800 Notebook



"The 800C notebook offers sleek styling, solid construction and hot performance... one of the fastest

notebooks we've ever tested," said *Windows Magazine*.

At 6.3 pounds, the Meridian 800 full-size notebook is light enough to travel anywhere yet it's large enough to use for presentations and everyday computing. And with your choice of a 486DX2-50 or DX4-100 processor, removable hard drives to 528MB, and RAM that's user upgradable to 20MB, this notebook is the raciest thing around.

For your viewing pleasure, the 800 is available with your choice of color displays—a whopping 10.3" dual scan or 9.5" active. You also get two Type II or one Type III PCMCIA slots, and an internal 3.5" 1.44MB floppy drive.

Meridian 850 Pentium™ Notebook

Ultimate horsepower that takes the checkered flag! The Meridian 850 gives you supreme Pentium performance in a bundle weighing only 6.8 pounds. It's light enough to race around the world with you yet it's

powerful and fast enough for the most demanding computing.

For turbo power, the Meridian 850 comes with your choice of Pentium-75 or Pentium-90 processor; user upgradable RAM to 32MB, 256K synchronous SRAM cache, and a removable hard drive to 1.3GB. For the best viewing, the 850 is available with your choice of color displays – a mammoth 10.3" SVGA (800 x 600) dual scan or 9.5" VGA active matrix. You also get 16-bit stereo sound through audio jacks (Sound Blaster Pro compatible) for the best in portable multi-media, two Type II or one Type III PCMCIA slots, and an internal 3.5" 1.44MB floppy.

Buy With Confidence

No matter which ZEOS notebook you purchase, you'll be getting the best service and support in the business! ZEOS has won seven *PC Magazine* Readers' Choice for Service & Reliability awards. And, ZEOS was the first to provide 24-hour toll-free technical support.

The ZEOS Meridian will support you as you face the daily rat race. It'll organize each event, tally the results, and even report back to the office – lap by lap. What a way to work – whether you're in the office or speeding around. For a swift notebook that's raring to go 24-hours-a-day, call your ZEOS Systems Consultant today at 800-554-5220.

	Package 1			Package 2			Package 3		
		400C	800C		400C	800C		400C	800C
486 & DX4	486DX2-50	\$1995	\$2195	486DX2-50	\$2295	\$2395	486DX2-50	CN! \$2595	CN! \$2695
	DX4-100	\$2395	\$2595	DX4-100	\$2695	\$2795	DX4-100	CN! \$2995	CN! \$3095
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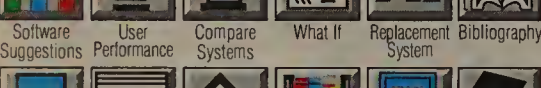
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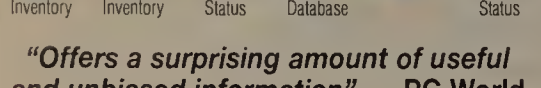
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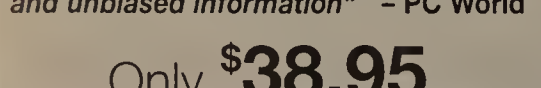
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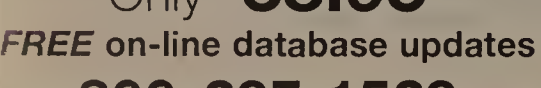
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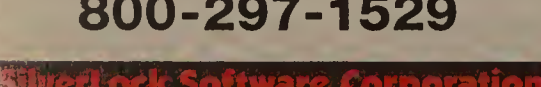
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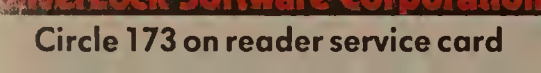
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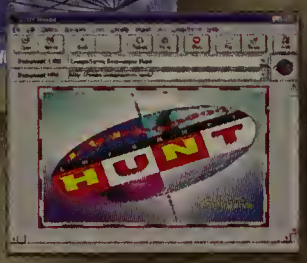
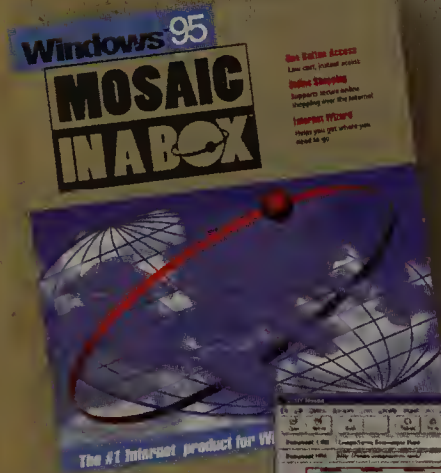


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Windows 95: Windows 3.1 Warmed Over, or a Hot New Dish?



New PC operating systems are almost as rare as a culinary invention. Windows 3.0 was to DOS as *boeuf bourgogne* is to hamburger, and Windows 3.1 and 3.11 merely added spice and removed a few slivers of bone. When Windows 95 lands on retail shelves later this month, will it really be a new operating system—or just a rehash of Windows 3.1? Our special report on Windows 95 takes you course by course through the ultimate taste test and offers our considered verdict.

After you read the special report assembled by Executive Editors Steve Fox and Andy Reinhardt, we think you'll agree that Windows 95 is a major new operating system with many outstanding dimensions. The section includes a look at the hardware required to run Windows 95; its top 35 features; tools that should be there but are missing; special perspectives on Windows 95 from a network administrator, a games enthusiast, and an OS/2 devotee; an analysis of Plug and Play, complete with a scorecard on 30 hardware add-ons; the fascinating experiences of five human guinea pigs who tackled both Windows 95 and OS/2 under the microscope of our usability lab; and a special news section reporting on utilities, applets, the first full-blown 32-bit applications, your options for Windows 95 support, and performance test results of Windows 95.

Steve's introductory article, "Windows 95: The Verdict Is In," surveys the experiences of the many *PC World* editors and contributors who have been using Windows 95 through the course of its various beta versions. Here you can glean the highlights of

our installation experiences, which were overwhelmingly but not universally favorable. You'll also learn how we fared with Plug and Play, and why most of us will remember using Windows 3.1 as the years of living dangerously compared with the greater stability of Windows 95.

If you've spent your days crimped by Windows 3.1's notorious resource limitations, you'll marvel at Steve's experiences running 18 programs simultaneously and still finding 40 percent of his resources free. The staff consensus about the Windows 95 user interface—perhaps the most important advance over Windows 3.1—is a standing ovation, with more than a few raspberries for the Explorer, File Manager's successor.

Nothing about Windows 95 will matter, however, unless you find it easy to use. Rather than evaluating its user interface in isolation, we chose to hold it to a higher standard. OS/2 Warp version 3 has received a great deal of praise for its object-oriented user interface.

That's one reason we invited five computer users representing typical *PC World* readers into our usability lab. Under the watchful eyes of Susan Silvius, our manager of usability testing, and author Naomi Wise, five brave volunteers ate new operating systems for breakfast, lunch, and dinner. When they'd had their fill, all five had acquired a taste for one and the same 32-bit confection. (Read Naomi's engaging "Notes From the Usability Lab" to find out which one it was.)

As for the critical question, "Should I upgrade?" the answer is yes—immediately on your home machine, and more carefully in the office. But be sure to read contributing editor Eric Knorr's sidebar, "Minimum Daily Require-

ments: Hardware Essentials," before taking the plunge.

The Top 10 Printers and PC World @Home

This month we introduce the first in a series of *PC World* Printer Top 10s, rating the best personal printers for home and office. Since ink jets and lasers vie for space on your personal desktop, we choose the best of both from a field of 16 models priced under \$800. In September and October, we'll add Top 10 ratings of workgroup and network (bigger than workgroup) printers. Our updates will help you choose the right printer at all times of the year.

Our research shows you're doing

The staff consensus about the Windows 95 user interface is a standing ovation, with more than a few raspberries for the Explorer.

more with your home PC and would like help in making the most of it. The new section *PC World @Home*, edited by Senior Associate Editor Christina Wood, answers that need. Senior Writer Roberta Furger's ever-popular *Consumer Watch* opens the section with advice on buying CD-ROMs. *HouseWare* provides concise product reviews, and in *House Calls*, Senior Associate Editor Lincoln Spector offers tips on solving common problems in home computing. His topic this month: homework. Contributing Editor Steve Bass, in his *Home Office* column, focuses on using your PC to control household devices. Once your chores are automated, your productivity will soar.

Phil Lemmons, Editor in Chief



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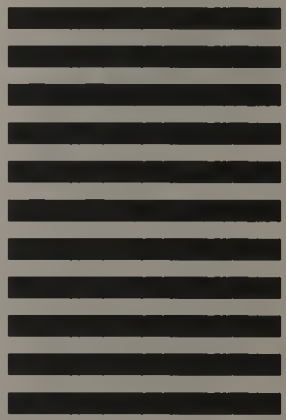


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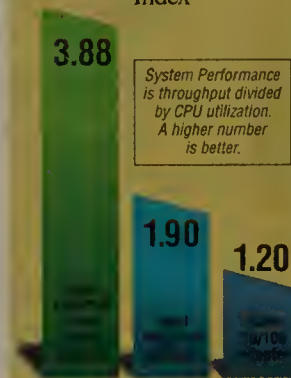


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*SOURCE: LANQuest Labs, April 1995

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The WinBook's a winner...



February-May 1995,
WinBook XP
DX2/50 B/255 Mono



May-June 1995,
WinBook XP
SX33 B/260 Mono

"...the new top dog..." "WinBook's DX4-100 entry this month is a winner in many respects. For one thing, it's a speed demon that produced great test results, finishing our benchmarks faster than a typical DX4-100 notebook—this makes it one of the fastest notebooks you can buy for under \$3000." *PC WORLD*, Top 20 PCs, May 1995



February-April 1995,
WinBook XP
DX4/75 B/125
Dual-scan

"The keyboard is comfortable, with big keys and a broad wrist rest." "System documentation is excellent." "Finally, the unit's modular design allows for easy replacement and upgrading of components. Adding up all the high points, we come up with a fantastic value and a number one budget mobile Best Buy."

PC WORLD, Top 20 PCs, Feb. 1995



August 1994, WinBook XP
DX2/50 4/260 Monochrome

With plenty of processing power, (and) enough battery life to handle a transcontinental flight easily,...the WinBook XP...is a value winner." "...the WinBook is the lightest full-size notebook in the roundup;..." "The WinBook XP posted an unprecedented battery life..., and though its dimensions are those of a regular-size notebook, its weight is closer to that of a subnotebook."

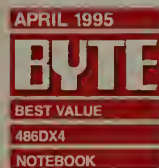
PC MAGAZINE, Cover Story: Notebooks, Aug. 1994



Most Improved Portable
January 1995
WinBook XP

"Is it too good to be true?...the WinBook has gone on to offer a notebook that everyone seems to want. The reason is simple: value....The WinBook XP offers good performance and surprisingly good battery life as well as affordable RAM and hard drive upgrades."

PC LAPTOP, 1994 Editors' Choice Awards, Jan. 1994



April 1995, WinBook XP
Best Value 486DX4 Notebook

"As the name says, the WinBook's a winner" "...the WinBook XP is an excellent value." (Awarded *BYTE* Best for Low Cost Systems and 2nd Runner-Up for Desktop Replacement)

BYTE, 30 No-Compromise Notebooks, April 1995

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PC WORLD—May, 1995



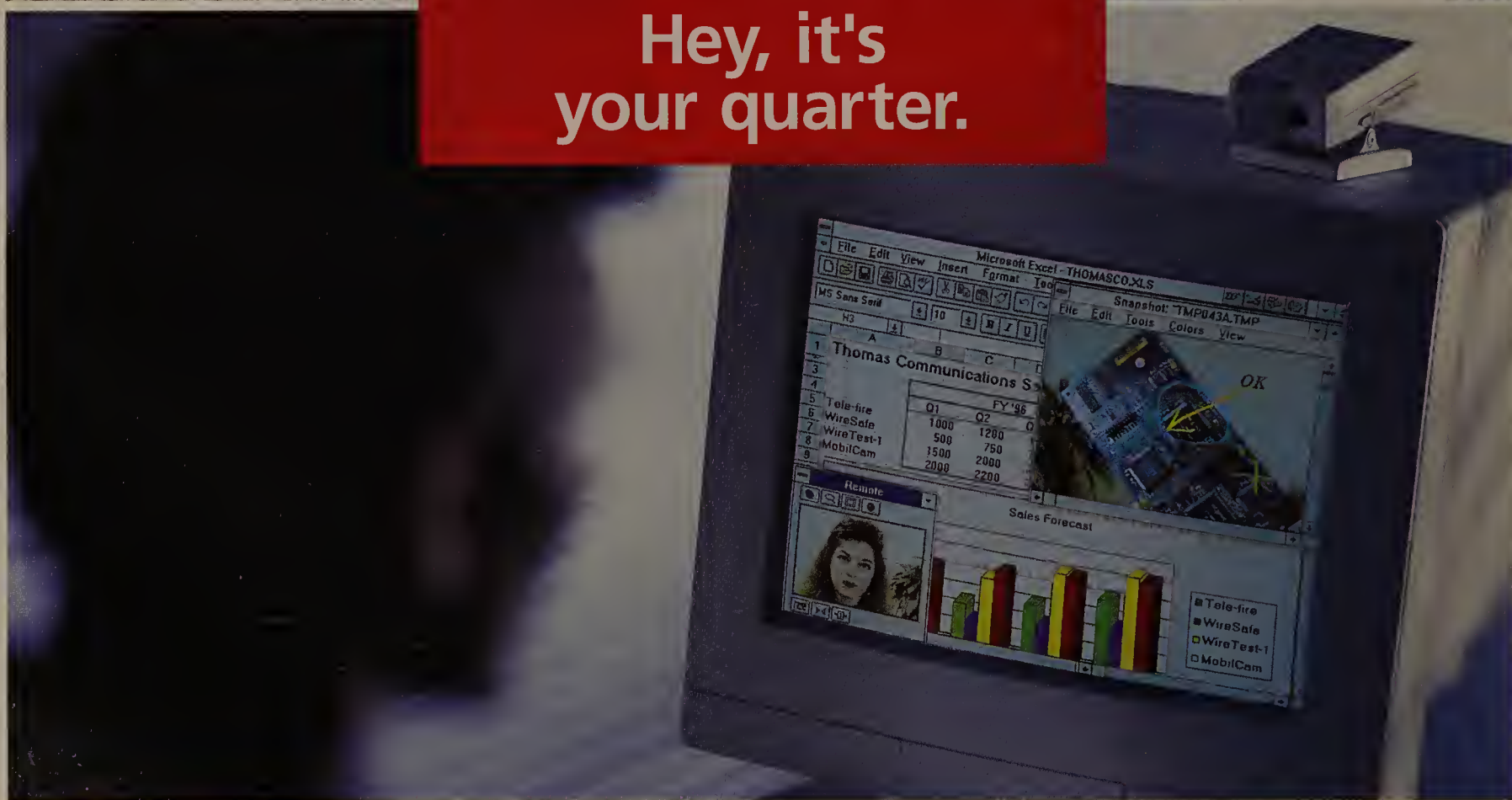
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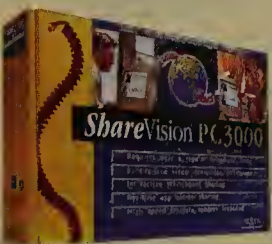


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Adolescent Operating Systems Provoke Users

John Q. User Speaks

Much has been said about Windows 95 in these pages and elsewhere ["Windows 95: Ready or Not...," *Top of the News*, June]. Overall, the momentum is in its favor. Barring a total disaster, it seems Windows 95 will earn Bill Gates his next billion or two; there's no real competition out there.

But until the beta arrived, I hadn't realized how close to disaster Microsoft swerved. I'm not a professional reviewer; I'm not a Windows basher; I don't own IBM stock. I'm just John Q. User.

What I wanted from Windows 95 was simple: stability, an end to the system resource nightmare, long file names, snappy performance (by graphical interface standards), and better hardware awareness.

What I got was something altogether different. The hardware awareness is there, and that's probably the best improvement. Long file names are another benefit, but in the MS-DOS window, the name is truncated with a tilde and a number.

Stability is wishful thinking, at least until I can upgrade all my apps to their 32-bit brethren. America Online's WAOL 2.5 freezes up shortly after making a connection; Procomm for Windows has similar difficulties if I multitask; Microsoft's built-in Network won't keep a connection; and setting up a SLIP/CLIP Internet connection is a nightmare. I'll chalk these problems up to sloppy beta code. However, they're disappointing in an OS that touts improved networking abilities.

Then there's performance. I'd heard that Windows 95 improves performance of 16-bit apps. That hasn't been my experience, but I'll discount the sluggish performance of both 16-bit and 32-bit apps on the assumption that the final OS will be fully optimized.

These criticisms only tap-dance

around the real problem, though: Windows 95 is nearly incoherent. Part of the problem is, it's a grab bag of ripped-off ideas from other operating systems. It's hard to believe that Windows 95 spent extensive time in Microsoft's usability labs.

A file folder metaphor has replaced the much-maligned File Manager. In my brief flirtation with OS/2 2.1, I found file folders to be overrated. But even if you like that metaphor, Windows 95's implementation is less mature.

Launching a program from the Start menu requires navigating several layers of menus—a throwback to DOS shells.

Win 95 begs for redesign, but Microsoft has so much at stake, it'll undoubtedly ship by year's end. To push users into it, Microsoft need only discontinue DOS and Windows 3.x. The sheer momentum of the Windows juggernaut will propel it. I guess I'll just have to learn to adapt. We all will.

Thomas Banks, Richmond, Virginia

Editor's response: Later betas of Windows 95 seemed to have fixed the stability and performance problems Banks encountered (see "Windows 95: The Verdict Is In" in this issue). As for Banks's take on Win 95's basic design, to each his own. —*Steve Fox*

Possessed by an OS

I've been a faithful subscriber to *PC World* for a couple of years now—many of your articles and tips make my computing life easier. I did, however, entertain thoughts that you might be motivated to endorse the upcoming Windows 95 over OS/2 Warp because it

will bring in more advertising dollars from software makers in the long run.

Please accept my deepest apologies. I got tired of waiting for Windows 95. After I saw commercials and read some articles elsewhere proclaiming OS/2 was equal to if not better than the forthcoming Windows product, I decided to purchase Warp.

Well, I believed a lie. I never had so



many problems with error messages, crashes, and so on. My favorite was the loop I never recovered from. I decided to take Warp off of my system and performed the myriad of instructions the IBM representative mailed to me. I followed his directions to the letter but still could not restore my system to what it was before I installed that demonic OS. The end result was that I had to format my hard drive.

Here I now sit happily, with Windows 3.11 installed. In the future I'll heed your articles and not rush into a \$90 blunder that purports to be an operating system.

David Ruffino, Internet

No-Hassle Returns

I enjoyed "Taking (Some of) the Mystery out of CD Shopping" [*Consumer Watch*, June]. I have one comment: While CompUSA sets up demo sys-

ILLUSTRATIONS: LEFT: JEFF BERLIN; RIGHT: JEFFREY PELO

tems for CD software, you can't always see the software you want. Also, seeing it run in the store is not a substitute for getting it to work at home. I prefer to go to stores with a liberal return policy. Two in my area are Software, Etc., and Babbage. Both take back software if you're dissatisfied.

CompUSA, while stocking a large and varied inventory, has a poor return policy. Basically, if you open the shrinkwrap, it's yours—whether you like it or not. I'd rather mail-order the software and save some money if I'm going to take that risk.

Anyway, I appreciate the fact that your editorial content reflects a level of veracity missing from many competing trade magazines. I trust what I read in *PC World*.

Mitch Maiman, Holbrook, New York

Attention, Internet Shoppers

I'm writing to inform you of inaccuracies in the otherwise interesting and informative "Merchants of Cyberspace" [April].

The Internet Mall has over 1500 stores and is a popular site on the World Wide Web (<http://www.mecklerweb.com/imall>).

There's no charge for shoppers to browse the Mall. And over 90 percent of the stores in the Mall are there without charge.

Businesses with E-mail addresses on CompuServe and America Online are as welcome as Fortune 1000 corporations with a massive Web presence. The level playing field is a reality at The Internet Mall—big companies get the same number of lines for ads as mom-and-pops.

Finally, neither PPP nor SLIP is required to access the Mall; users can get a copy of the latest listings from a BBS or from FidoNet via E-mail. The information is also regularly uploaded to AOL, CompuServe, eWorld, and ZiffNet, among others.

I am most concerned about an error in the chart, which indicated that The Internet Mall charges extra for shopping. That's incorrect. It's all free, and it's a tremendous

resource for shoppers and entrepreneurs.

Thanks for giving me a chance to set the record straight.

Dave Taylor, proprietor, The Internet Mall

Full-Service Education

I chuckled as I read *Full Disclosure* [June], realizing that I too have used my PC to do things I could have done more efficiently in other ways. But I disagree with Stephen Manes's assessment of the usefulness of technology in relation to schools.

Today's kids have to cope with more data than their grandparents ever dreamed of. Technology provides coping tools for almost everyone, yet these tools are not available to teachers.

Schools must adapt along with the rest of society if they are to provide children with the skills they will need as adults. This does not mean simply pasting computers into the classroom—that would make such technology the equivalent of an extremely expensive textbook, as Manes implied.

We need to rethink what core capabilities kids require to compete successfully in the future, and we must reengineer the classroom to get them there. This includes teaching skills for sorting data, making judgments about what is relevant, and synthesizing data into useful information.

A lot to ask of kids, huh? But when you consider what they're exposed to every day, they need to learn this stuff. Technology in the classroom is not about teaching the same old lesson using an expensive tool; it is about teaching new lessons.

Sharon Foley, president, Tulsa Associates Making Technology Work for Educators

The Greening of Computers

I've seen coverage of the "green revolution" in *PC World* recently. Yet power conservation software may prove to be anything but environmentally friendly. Power-saving software turns components on and off repeatedly every day, but the life of the filament in a monitor's picture tube is shortened by being turned on and off. Further, the life span of a hard disk is measured in on/off cycles, and repeated thermal expansion and contraction dramatically shortens the life of some components.

As a scientist, I support a holistic ap-

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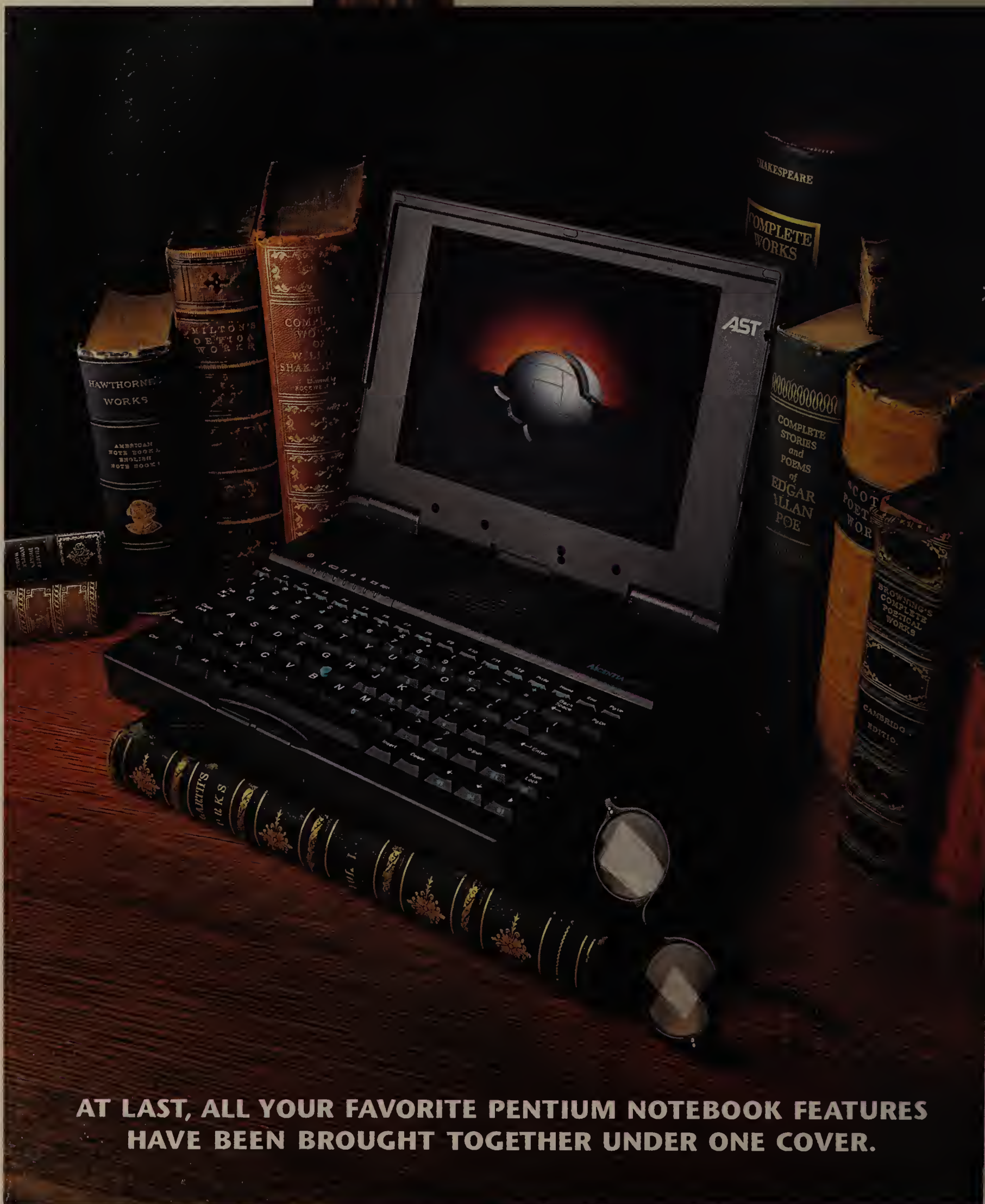
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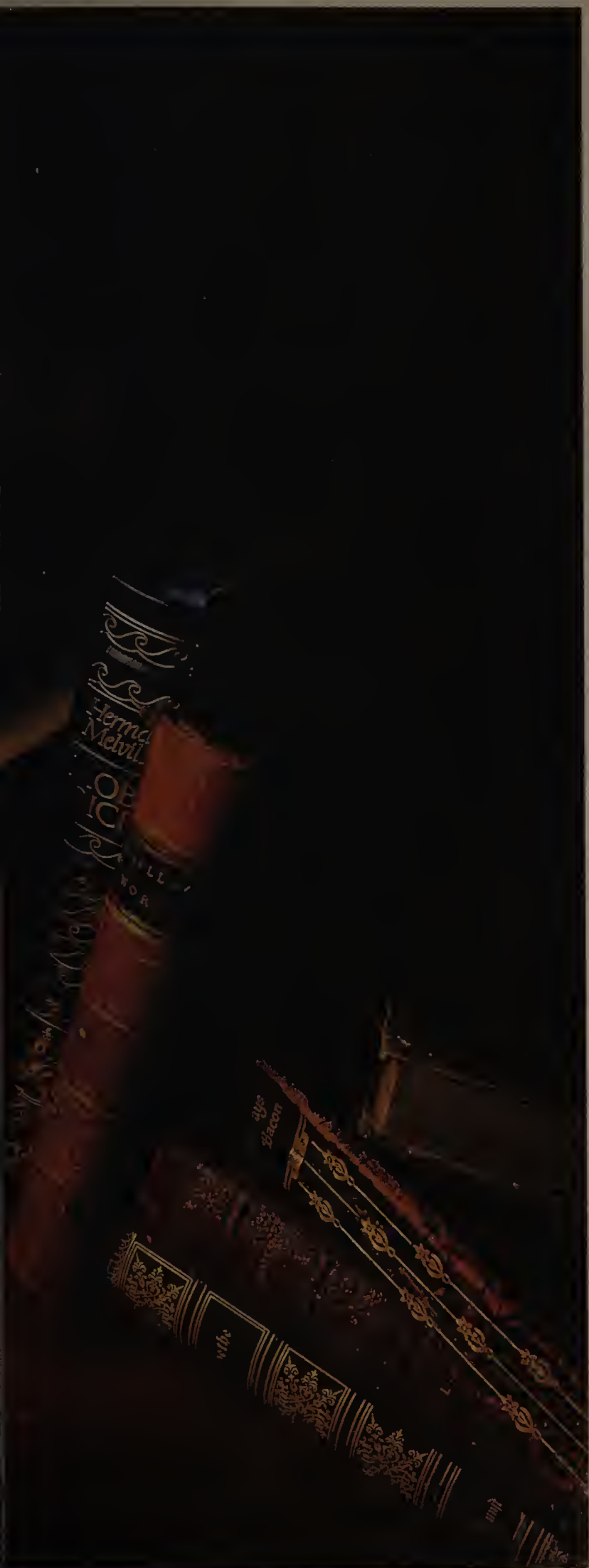
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LETTERS

proach to our use of the planet's resources, but I wonder whether the need to manufacture and ship replacements for prematurely failing components outweighs the environmental benefits of "green" PCs.

Michael Hastings, Dickinson, North Dakota

When It's Good, It's Very, Very Good

I hope "Sleeping Sickness" by Kendall Gelner [*Letters*, May] won't lead readers to believe that all Energy Star PCs are slow. My AST desktop, which I bought for its Energy Star features, is not slow at all.

It has two sleep modes: light sleep (it awakes when a key is touched) and deep sleep (it awakes when a password is entered). In both cases, it's ready to go instantly. The one problem is that a couple times a month the monitor doesn't wake up, resulting in ugly, distorted video. The remedy is a cold reboot.

Michael V. Mahoney, San Francisco

Le Mot Juste, the Sequel

I read the letter by Richard S. Russell [*Letters*, April] concerning his proposed name for the round-cornered rectangles so commonly used in modern word processing and graphics programs. I'd like to propose a more descriptive name—roundtangles.

Now, can I license this name to the software companies that use it?

Lance Feldman, Internet

Corrections and Clarifications

April's "Big Screens" review reported ADI's MicroScan 5EP cut off both sides of Windows' desktop by 1/8 inch. This happens with Diamond Stealth 64 graphics cards. To correct it, ADI recommends using Diamond's In-Control utility to adjust the refresh rate and the image's position.

On page 123 of the May issue, we listed an incorrect 800 number for Okna. The correct number is 800/438-6562.

In the "Backup and Archive to a Higher Power" sidebar in our May "No-Brainer Backups," we switched the labels for the photos of the Conner TapeStor 4000 and the IBM ImageStar 1.3GB Half-height Optical Disk Drive.

Letters welcomes your responses and ideas. See page 12 for contact information.

Can you increase RAM just by adding Software?



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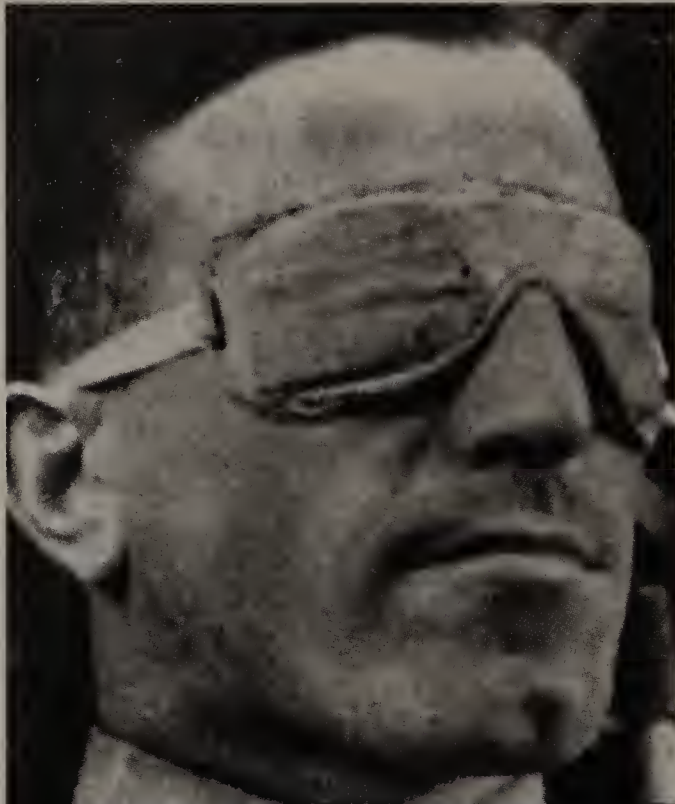
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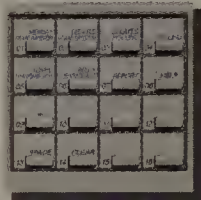
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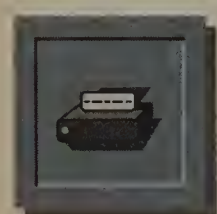
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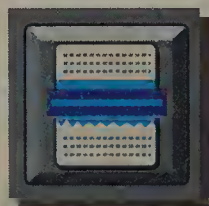
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Canon

A (Virtual) CD-ROM on Every Desk

Everyone wants a CD-ROM drive on their desktop, whether to search vast databases for demographic or competitive information or to play *Myst* into the wee hours when the staff has gone home. But if many people in your company need to access materials on disc, you could go broke trying to outfit them all with the necessary hardware.

This month Warner Orr, a communications specialist with golf equipment maker Karsten Manufacturing Corporation in Phoenix, tells how his company found a way to share CD-ROMs without breaking the bank. —*Ed.*

By the Books

When a company needs to share information, technology can be a remarkable asset. But when the technology is difficult to use, it gets in people's way, and they quickly revert to old-fashioned ways of getting the work done.

I work for Karsten Manufacturing Corporation, maker of Ping golf equipment, used by both amateur and professional golfers. The 29-year-old company has 2000 employees in 30 departments. Almost half of them work in administrative support, marketing, customer service, and other desk jobs, using our IBM Micro Channel 486-based network.

These desk jobs often require access to large libraries of material. For example, our environmental safety group, which ensures that our manufacturing processes comply with the law, needs huge volumes of EPA regulations governing the handling of chemicals. Our legal department does a patent search whenever we come up with a new product design or name. And our marketing and administrative staffs use encyclopedias, atlases, demographic data, dictionaries, and census information.

Our employees also share software.

For example, our graphic arts and communications departments use clip art and Photo CD libraries to produce hundreds of brochures, newsletters, and posters. But with all the graphic artists and programmers installing clip art and software, hard disks filled up in a hurry. We tried to solve this problem by putting programs on file servers. But again, the hard disks filled up. The technology was making people less productive, not more so.

This was all before we discovered CD-ROMs, about a year and a half ago. We installed CD-ROM drives on a few departmental machines and found we could give users convenient access to large amounts of data. The problem was, there were hundreds of users in the company who might benefit from access to CDs—but at a cost of around \$850 per workstation (including a SCSI card, software, the CD-ROM drive, and labor), it was too expensive to outfit everyone for multimedia.

Sharing the Wealth

We came up with what we thought was the obvious solution: to hook up CD-ROM drives to the network. We assumed this would let people share CDs so we wouldn't have to spend a lot of money for dedicated hardware.

Since we were already running Novell's NetWare, we decided to try a free utility, Novell's CD-ROM NetWare Loadable Module (NLM), which makes it possible to share CD-ROMs over the network. Unfortunately, implementing it was a nightmare: The administrator had to install a SCSI card



Warner Orr,
communications
specialist for
Karsten Manufac-
turing in Phoenix.

and wrestle with IRQ settings and drivers.

After all this, users found NLM's performance unbearably slow, and they couldn't figure out how it worked, since they needed to understand NetWare and how the CD-ROM drives were mapped. After a month, we dropped NLM. People went back to thumbing through paper sources.

Then we discovered an \$895 combination hardware-software solution—Microtest's DiscPort, which turns CD-ROM drives into network resources. A piece of hardware that looks like a long, thin paperback book, DiscPort has a SCSI port that connects to a CD-ROM drive on one end and a plug for a network cable on the other. The device can reside anywhere—in a cubicle or down the hall—and it lets users view the CD-ROM drive as if it were another network hard drive. In addition, users can access the same CD-ROM disc or discs simultaneously

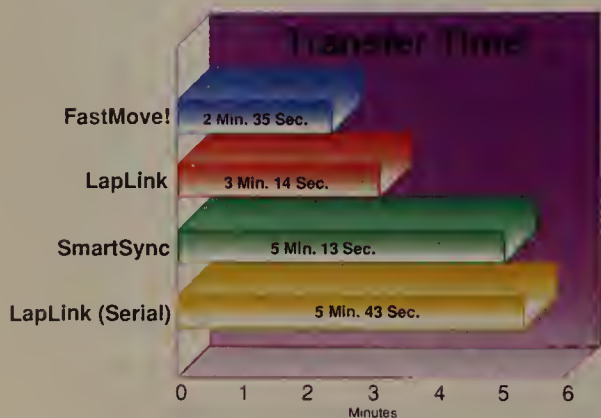
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DiscPort is easy to use. It comes with a Windows program called DiscView that you install on each workstation. DiscView works like Windows' File Manager. (It also comes in a Macintosh flavor.) Including software, it costs \$895 for ethernet networks and \$1200 for token ring networks; there is no per-seat licensing.

With the DiscView interface, users can see which CD-ROMs are available. They click, say, the CorelDraw CD-ROM icon, and it's ready in a couple of seconds. We run several DiscPort drives with preloaded DOS, Windows, or Macintosh-based CD-ROMs; users can just click the desired application icons. To change to a CD-ROM that's not loaded, they walk over to another drive and insert that disk. If DiscView has been told to automatically mount the CD, an icon for that CD appears each time it's inserted; when the CD is not in the drive, the icon is grayed out.

Because it's fully integrated with Netware, DiscPort also avoids installation and configuration hassles, allowing us to use Netware's standard management tools for security and privacy. DiscPort has made life easier for all our employees who needed access to CD-ROMs. For example, our environmental group can access EPA regulations on disc. When laws are updated or changed, our legal department's assistant no longer has to tear out old pages and insert new ones in binders: Instead, she just installs a new CD-ROM.

As more and more applications and services become available on multimedia, we expect our use of DiscPort to increase. We hope more employees will take advantage of this new capability to access current research information right from their desks.

- **DiscPort** \$895 for ethernet networks, \$1200 for token ring networks; Microtest; 602/997-6254
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Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay \$300 for published columns. See page 12 for contact information.

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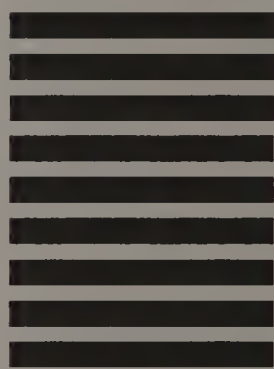
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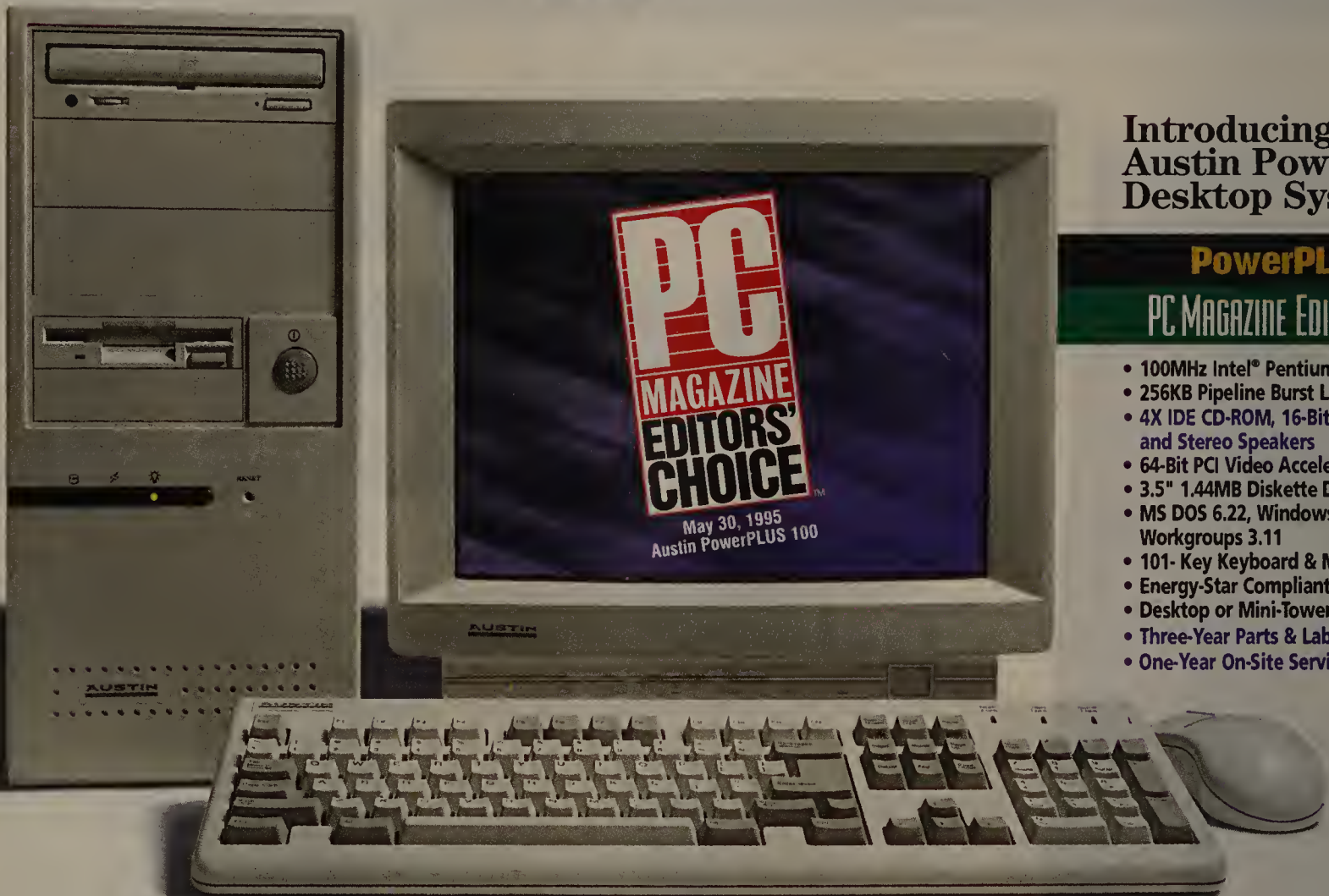
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Dell's featured computer artist is Nance Paternoster of San Francisco, CA.

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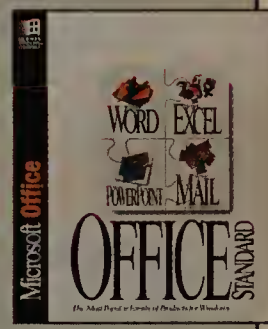
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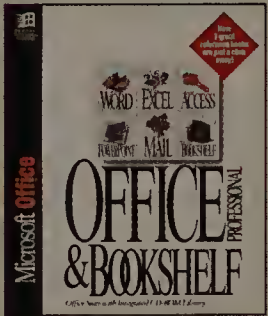
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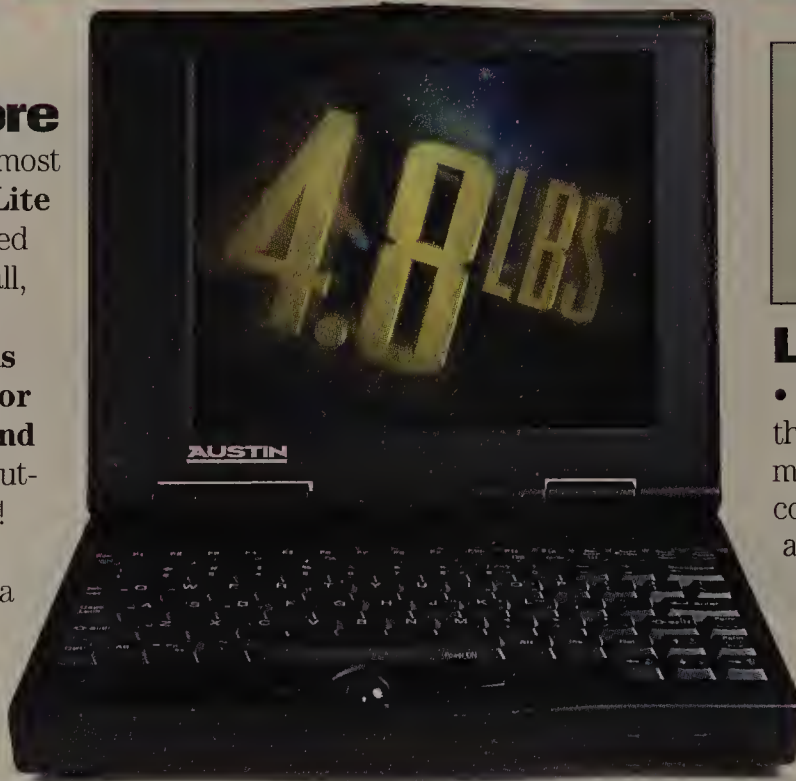
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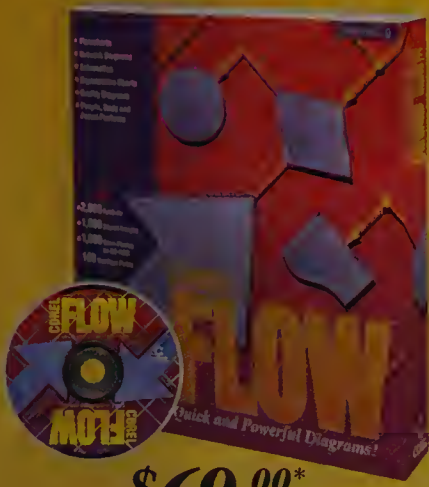
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Photos	1,000	0
Clipart	1,000	0
Spell Checker	yes	no

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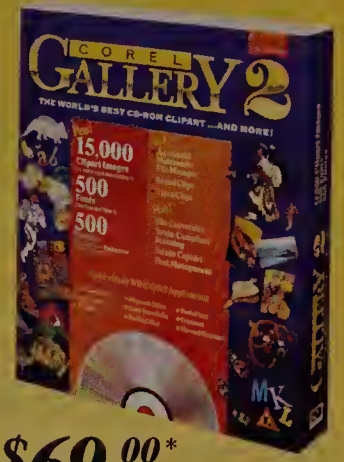
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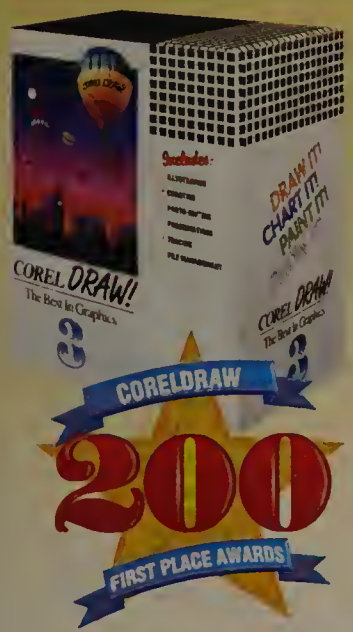
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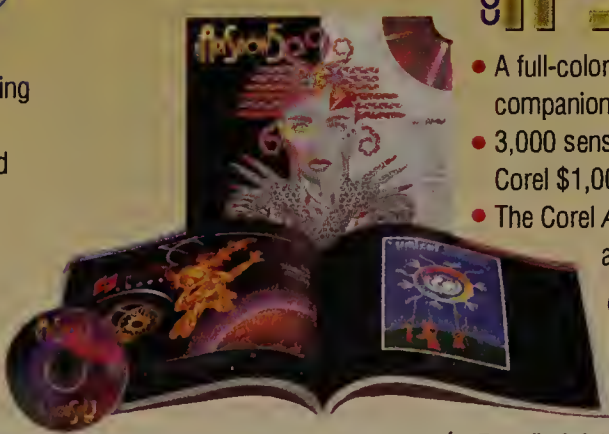
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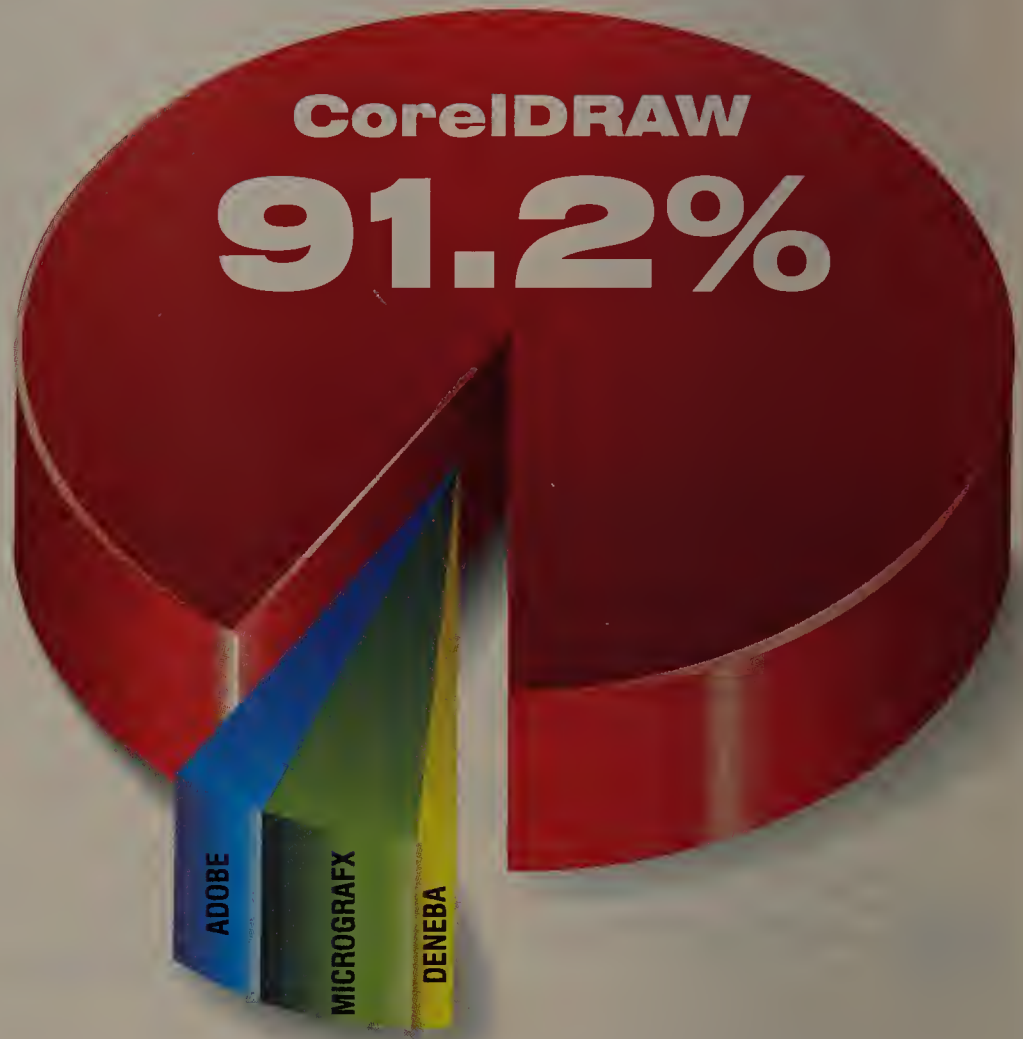
THE OVERWHELMING CHOICE OF PC USERS!

#1

Market Share
Windows Illustration
Software
PC Data,
December Sales, 1994

CorelDRAW NUMBER ONE in ILLUSTRATION

Company	Units	Sales
Corel	7,609	1,586,519.83
Adobe	257	73,968.64
Micrografx	380	36,696.38
Deneba	98	15,899.24
Totals	8,344	1,713,083.90



The results are in!

CorelDRAW is the #1 choice for PC users. Year after year, survey after survey, CorelDRAW continues to dominate the illustration market with the best graphics software available.

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Product	S.L.P. (US\$)	Score
Corel VENTURA 5	\$595	6.8
QuarkXPress	\$895	6.7
Aldus PageMaker	\$895	6.2

INFOWORLD
Report Card Rating,
Desktop Publishing Software
March 20, 1995

3.5" disk version

Corel PHOTO-PAINT* NUMBER ONE in IMAGE-EDITING

Product	S.L.P. (US\$)	Overall weighted score
Corel PHOTO-PAINT 5 Plus	\$249	44
Micrografx Picture Publisher 5.0	\$595	42
Adobe PhotoShop 3.0	\$895	39
Fractal Design Painter 3	\$499	38

PC World,
Best Buy Award,
April, 1995

3.5" disk version

#1

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* Available as standalone products.

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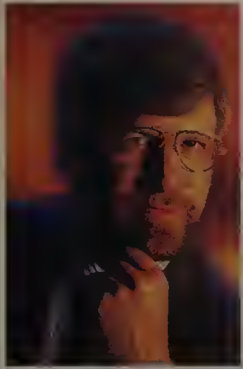
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Beta: It's Not Just Testing Anymore



I am stunned. A software manufacturer recently disclosed something I did not expect to hear in my lifetime. Corel says some of its beta testers, those anonymous folks who evaluate unfinished software in the real world before companies foist it on an unsuspecting public, are actually—no! impossible!—being *paid* for their efforts.

Stop the presses! Corel's policy recognizes the importance of the long-suffering beta tester. It encourages more detailed bug reports. It suggests that beta testing is crucial in making products work the way they're supposed to.

It also bucks a distressing trend that may be insurmountable. Testing, regrettably, is no longer the main event in the so-called beta period, when products are still too unstable for prime time. Marketing considerations have crept in so insidiously that the common descriptive phrase has become "beta version." The word "test," you will note, has mysteriously disappeared.

Beta has increasingly become a marketing opportunity and a chance for early hype, as unfinished releases are distributed to a wider and wider public. The goal is not to assemble a bigger collection of bug reports, but to provide a "sneak preview" for software and hardware developers and other customers who need early evaluation copies, and to boost the egos of those who consider themselves insiders and proselytizers. Beta is also useful as a trial balloon in the industry press. If a feature is reviewed savagely, you can remove or fix it before real-world pundits take their shot. No time for a fix?

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By Stephen Manes

Your PR geniuses can develop tactics for dealing with future complaints.

The most recent example, of course, is the Windows 95 Preview program, a beta for which Microsoft had the chutzpah to charge some 350,000 of its closest friends \$32. This idea, like many other things at Microsoft, was not entirely original. Years ago, in a masterstroke unequalled since Tom Sawyer got his peers to paint that famous fence, the developer of a program called WordVision sold its "Pioneer Edition" (i.e., beta) on the theory that these paying pioneers could make suggestions that would be incorporated in the final product (which eventually laid a colossal egg).

At least Microsoft separated the Preview program from its official beta program. Unlike true beta testers, Preview buyers were not entitled to updated bug-fixing "builds," nor were they exhorted to send in those bugs. They probably wouldn't have bothered anyway: Among the 50,000 "official" beta testers for Windows 95, Microsoft considers only about 5000 "active."

Send in the Bugs

Beta testing itself now focuses largely on problems that appear in configurations of hardware and software that developers don't have sitting around in the factory. Yet beta testing methodology is largely nonexistent. Developers give the program to "hard-core beta sites," selfless souls willing to do the dirty work of testing and reporting. But aside from an effort to obtain hardware and software diversity, there doesn't seem to be much science in the selection of testers or what they are asked to do. Essentially, it's a matter of finding willing guinea pigs and asking them to

holler when something goes wrong.

So I can only applaud Corel's new plan. The company says its paid testers are selected on a combination of credentials and past performance in finding bugs. Corel won't say precisely how much money is involved, just that it's somewhere between 1000 and 4000 Yankee dollars per person. That's hardly a lot, but it's a nice supplement to the disc and T-shirt most testers get.

Along with their typically more free-form duties, the paid testers file de-

Software beta testing is essentially a matter of finding willing guinea pigs and asking them to holler when something goes wrong.

tailed reports using scripts provided by the company. Their complaints are routed to the people who can do something about them, with status reports returned via E-mail, keeping communications open. It sounds downright methodical. Unfortunately, only a couple dozen people are on the cash plan, and it's hardly a get-rich-quick scheme.

Microsoft, Novell, and others report no shortage of people eager to live with and document those pesky bugs in exchange for nothing more than an early, secret look at their product and a free copy of the final version. But if that process is so wonderful, how come so many bugs sneak through? Corel's experiment is worth watching to see if the old adage, "You get what you pay for," applies in the Land of Beta.

PC World *contributing editor Stephen Manes is a columnist for the New York Times and coauthor of Gates: How Microsoft's Mogul Reinvented an Industry (Touchstone/Simon & Schuster, 1994, 800/223-2348).*

How do I gain a competitive edge?

I work hard.

Think fast.

And hire the right people.

I give them computers.

And networks.

Peripherals.

And software.

I seek solutions.

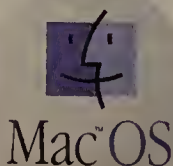
Without creating new problems.

I take time to choose wisely.

And find ways to save time.

I know what to look for.

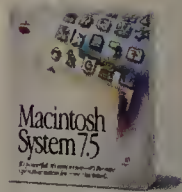
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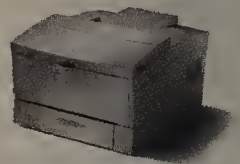
Mac OS

2 in a series

The Mac OS Advantage



The Mac OS. It's the operating system that helped make the Macintosh famous. It helps people do more in less time. In fact, according to an Arthur D. Little study, people using the Mac OS are 44% more productive than those who use Windows.* It's also a great way to get the power of RISC on a desktop PC.



Plug and Play. We invented it. And while many have tried to imitate this perfect union of hardware and software, nobody else actually does it today. Which means nobody else makes it so easy to set up and use all the software, peripherals, accessories and networks you need to help your people be productive.



The real beauty of the Mac OS and Apple® advancements like QuickDraw™ 3D and QuickTime® VR is that people don't even know they're there. What they *do* know is that with a PC running Mac OS, it's actually practical to use multimedia, video-conferencing, 3-D visualization and virtual reality.



Thousands of applications now run under the Mac OS. Which means thousands of applications share the intuitive interface pioneered by Macintosh. In the future, people won't even have to think about individual programs at all. They'll just sit down at their Mac OS desktop and get right to work.



Used to be, the only way to get your hands on the Mac OS was to get your hands on an Apple Macintosh. Today, you'll find it on PCs from Radius, Power Computing and more. The same places, in fact, where you'll find our new logo. For more information, call **800-472-4342, ext. 150**, today. Or contact us via the Internet at <http://www.info.apple.com/macOS/macOSmain.html>.

Apple 

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133-MHz Pentiums in Every Price Range and Configuration

Just one month after our first look at 133-MHz Pentium PCs—the fastest we have ever tested—new systems have shipped from AST, AT&T, and USA Flex. Most of these come in configurations that only a few months ago would have been beyond the reach of most buyers: 16MB of RAM, secondary caches of 256K or more, 64-bit PCI-bus graphics accelerators, and enormous hard drives. Many of these systems feature integrated SCSI, 14.4-kbps fax-modems, and quadruple-speed CD-ROMs. We're talking power.

AST has introduced aggressively priced 133-MHz Pentium models in all three of its desktop product lines. The \$3425 Bravo MS P/133 Model 850W, for example, comes with 8MB of RAM, 256K of secondary cache, an 850MB Enhanced IDE hard disk, an integrated 64-bit PCI graphics accelerator, 16-bit audio, and a 15-inch monitor.

The AST Advantage Adventure 8133p Pentium system, which is targeted specifically at the home market,



USA FLEX'S PT-133 POWER SYSTEM is packed with features, including Intel's newest and fastest CPU: the 133-MHz Pentium.

lists for \$3825. This computer comes with 16MB of RAM, a 1GB hard disk, a quadruple-speed CD-ROM drive, an integrated 32-bit PCI graphics controller, a 16-bit sound card, a 14.4-kbps fax-modem, a microphone, stereo speakers, and a 15-inch monitor.

For the power user, the \$4675 Premmia GX P/133 system features an EISA/PCI bus, 16MB of RAM, 512K of secondary cache, a huge 1.6GB Enhanced IDE hard disk, a 64-bit PCI graphics accelerator, an integrated SCSI controller, and a 15-inch monitor.

A new Pentium offering from AT&T, the \$5198 Globalyst 730 comes configured with 16MB of RAM, 256K of secondary cache, an 850MB Enhanced IDE hard disk, an integrated 64-bit PCI graphics accelerator with 2MB of VRAM, a quadruple-speed CD-ROM drive, integrated 16-bit audio, stereo speakers, and a 17-inch monitor. The Globalyst 730 uses a motherboard built around

a VLSI Corporation chip set, which is not quite as fast for desktop use as Intel's Triton PCI counterpart. The Globalyst 730 includes an extra socket to accommodate an optional second Pentium chip.

USA Flex introduces the midrange PT-133 Power System, a \$4599 midsize-tower computer that comes with 16MB of high-speed Extended

Data Out (EDO) RAM, 256K of secondary cache, a 1.2GB Enhanced IDE hard disk, 64-bit graphics acceleration, a Boca 14.4-kbps fax-modem, a 16-bit sound card, a 6X-speed SCSI CD-ROM drive, a multimedia CD bundle, and a 17-inch monitor with stereo speakers. The PT-133 Power System also doesn't use Intel's Triton chip set, but you can boost performance by ordering the system with 256K of pipelined burst cache for an additional \$200.

With faster processors debuting virtually every other month, who is doing the buying now? Consumers will adopt the 133-MHz Pentium ahead of corporate users, predicts Hollie Chriss Cronin, a spokesperson for AST Research. She says that this pattern occurred with multimedia as well as with earlier Pentium chips.

—Susan Silvius

Bravo MS P/133, Model 850W

List price: \$3425

Advantage Adventure 8133p

List price: \$3825

Premmia GX P/133

List price: \$4675

Three 133-MHz Pentium systems configured for demanding users.

AST Research, Inc.

800/876-4278,
714/727-4141

Reader service no. 722

Globalyst 730

133-MHz Pentium system designed for multiprocessing.

AT&T Global Information Solutions

800/447-1124

List price: \$5198

Reader service no. 723

PT-133 Power System

Midrange 133-MHz system with a 6X CD-ROM drive.

USA Flex

800/872-3539

List price: \$4599

Reader service no. 724

Top of the News

does not appear in this month's *PC World* to enable us to offer extensive coverage of Windows 95. The section will return in its usual format and location next month. Turn to "Windows 95: The Verdict is In" for all you need to know about Windows 95.

New 90- and 100-MHz Pentium Notebooks Pack Power and Features

The latest batch of Pentium notebooks offers a fix for the mobile power fiend. Toshiba's Portégé 610CT boasts 90-MHz power in a fully featured subnotebook. Dell's Latitude XPi, one of the least expensive notebooks in its class, also comes with a 90-MHz Pentium. And Aspen's Universa P-100 is the first 100-MHz Pentium-powered notebook we know of.

But this level of performance and features doesn't come cheap: These systems can run

you more than \$4000, and battery life may be shorter than what you're used to.

In *PC World* tests of similar products, Pentium-90 notebooks are the fastest we've seen so far. Moreover, the Aspen Universa, with its 100-MHz processor, could prove the fastest notebook yet. (The systems in this article had not been tested at press time.)

For the most part, the Pentium processors in these systems operate at 2.9 volts, not the usual 3.3 volts; this means that the Pentium-90 and Pentium-100 CPUs consume up to 30 percent less power than their desktop counterparts, according to Intel. However, the company makes no claim about the effect the low-power CPU may have on battery life.

And short battery life is a problem with Pentium notebooks. Pentium-90 and Pentium-100 notes will likely draw more power than their 75-MHz counterparts, whose batteries generally give out in less than 4 hours. As a result, the faster systems will need more juice just to equal their slower siblings in battery operating time. The products described here address the battery issue in different ways: Two employ lithium ion batteries, and the other accepts two nickel-metal hydride (NiMH) batteries.

Small and Powerful

If you want the most power per pound, the \$4649 Toshiba Portégé 610CT is potentially your best bet. The system weighs a mere 4.8 pounds, but it is heavy on features, including 8MB of high-speed EDO



PENTIUM POWER IN A SMALL PACKAGE: The Portégé 310CT is the first subnotebook with a 90-MHz processor.

RAM, a spacious 686MB hard drive, and a 9.5-inch active-matrix color screen. For storage and expansion, it has a PC Card slot that holds two Type II cards (or one Type III card), a 3.5-inch external floppy drive, and an optional port replicator that allows you to easily adapt your notebook as a desktop PC and add multimedia hardware. The 610CT also has built-in 16-bit sound with MIDI support, speakers, and a microphone. On the downside, the unit's small size means a small keyboard.

For those on a tighter budget, Dell's Latitude XPi comes with 8MB of RAM, a removable 340MB hard drive, and a 10.4-inch screen (either dual-scan or active-matrix color). The dual-scan model costs \$3599; the active-matrix model, \$4499. Other notable standard features include 256K of secondary cache, a 3.5-inch floppy drive, a PC Card Type III slot, and 1MB of video RAM. The system also comes with an ex-

pansion port for Dell's Advanced Port Replicator. At 6.2 pounds, the XPi is light for a product in its class.

The 100-MHz Option

Aspen's Universa P-100 is configured similarly to the Dell, with 8MB of RAM, a 340MB removable hard drive, 256K of secondary cache, 1MB of VRAM, and a 3.5-inch floppy drive. For the color display, you can choose either the 10.2-inch active-matrix (\$3995) or the 10.3-inch dual-scan (\$3195). The unit also has an optional port replicator (\$125) and an extra serial port for multimedia options. Aspen has kept the price low by using two NiMH batteries instead of a single lithium battery. But this adds weight, bringing the system's total weight to 6.9 pounds.

All three Pentium notes are worth considering if your priority is performance. Just remember that the power will cost you in both price and battery life.

—Arden M. Hoffman

Aspen Universa P-100

One of the first 100-MHz Pentium notebooks also features a low price.

Aspen Computer
800/472-3273

List price: \$3995 (with active-matrix screen)
Reader service no. 725

Dell Latitude XPi

A 90-MHz Pentium note with a lithium ion battery, a removable hard drive, and a very competitive price.

Dell Computer Corp.
800/289-3355

List price: \$4499 (with active-matrix screen)
Reader service no. 726

Toshiba Portégé 610CT

The first 90-MHz Pentium subnote with all the features of larger portables.

Toshiba America Information Systems

800/334-3445

List price: \$4649 (with active-matrix screen)
Reader service no. 727

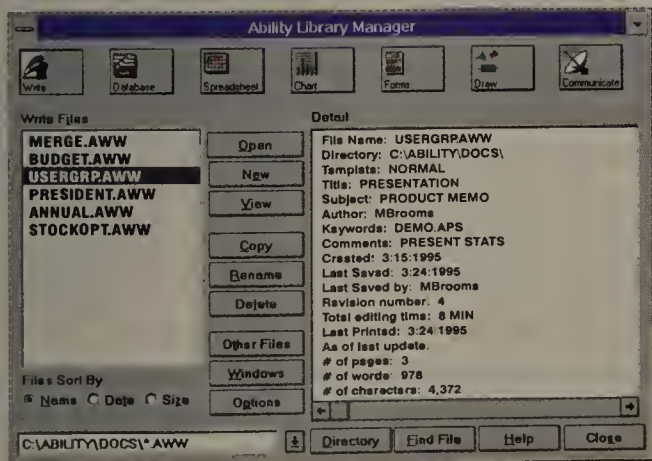
Ability, an Office Suite easier, less expensive and \$9.95 for 30 days.

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Ability Library Manager

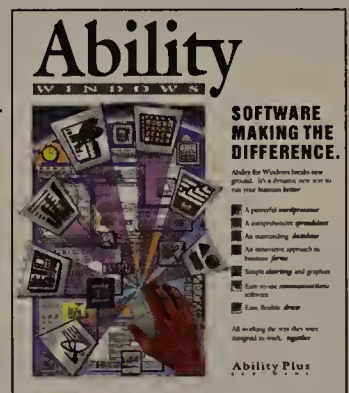
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Okidata's High-Quality Ink Jet, Fast LED Printer

Printers for the small and home office will offer continual improvements in print quality this year. Case in point: Okidata has delivered a high-quality color ink jet and an affordable LED (laser-class) printer with up to 600-by-1200-dpi resolution

The Okijet 2010 color ink jet, expected to have a street price of \$399, provides terrific print quality. While most ink jets in this price range support 300- or 360-dpi resolution in color, the Okijet 2010 prints in color at 600 by 300 dpi. In my informal tests, the Okijet's output quality was excellent, particularly with photographs.

I found that the Okijet 2010 printed at 2 to 3 pages per minute in monochrome, an average speed for printers in this price range. It's rated at 2 to 4 minutes per page in color. The tray holds 150 sheets, an above-average capacity, and has a feeder for 15 envelopes. The straight paper path lets you print on labels and heavy stock.

On the downside, this printer takes up more desk space than most color ink jets. It's also quite noisy, often sounding like it's sawing away at a print job.

If you've been shopping for a

fast, high-quality monochrome printer, check out Okidata's OL810e. With an expected street price of \$799, this LED printer supports 600-dpi resolution for text and an impressive 600 by 1200 dpi in graphics mode. Its rated speed is 8 pages per minute. It comes with a 250-sheet tray; a second 500-sheet tray is optional. The printer includes a 25-MHz RISC processor and 2MB of RAM, which acts like 4MB thanks to compression technology, the vendor says. No PostScript option is available.

—Laurianne McLaughlin



THE OKIJET 2010 COLOR INK JET offers solid performance and great-looking output. Expected to sell for only \$399, it's also a good value.

Tiny Scanner and Software Help You Get Organized

When it comes to saving paper, there are two types of people: filers and pilers. If you're a filer, you save papers neatly but run out of space. If you're a piler like me, you cover your desk in paper—lots of paper—and then, during spasmodic cleaning fits, you throw away something important. The \$499 Epson Personal Document Station can help both types. This tiny scanner converts all that paper into electronic files for storage in your PC, then lets you manage the files using bundled OCR and file management software from Xerox.

This clever 4.8-pound scanner doesn't take up much desk space: Its footprint measures about the same as a copy of *PC World*. It's about 2.5 inches tall and sits flat on your desk like a printer. The scanner automatically feeds ten sheets of regular

or legal-size paper, a timesaving advantage over some competing personal scanners, which accept only one page at a time. With an included attachment, the Epson scanner even accepts checks and business cards.

In my informal tests, the Epson unit's speed and quality were good. The scanner is rated at 4 pages per minute, it provides 300-dpi resolution with 256 shades of gray, and you can use it with text and photos. Epson's text enhancement technology gets rid of background marks—helpful when you scan faxes.

For OCR tasks and file management, you use Xerox software (TextBridge 3.0 and Visual Recall). When you scan in a document, you can choose to save it as unformatted ASCII text, as formatted WYSIWYG text (to save word processor formatting, for example), or as

Epson Personal Document Station

This tiny, fast scanner and bundled Xerox software can clear a mountain of paper off your desk.

Epson America Inc.
800/289-3776 ext. 3000,
310/782-0770
List price: \$499

text and images. The software then displays a thumbnail image of the page. You may save the document or send it via popular fax or E-mail programs. For working with stored files, Visual Recall provides search and display capabilities.

Despite its tricky installation, this product has a lot to offer. It'll certainly get you organized. And if you're a piler, you'll see the top of your desk again.

—Laurianne McLaughlin

Okijet 2010 and OL810e

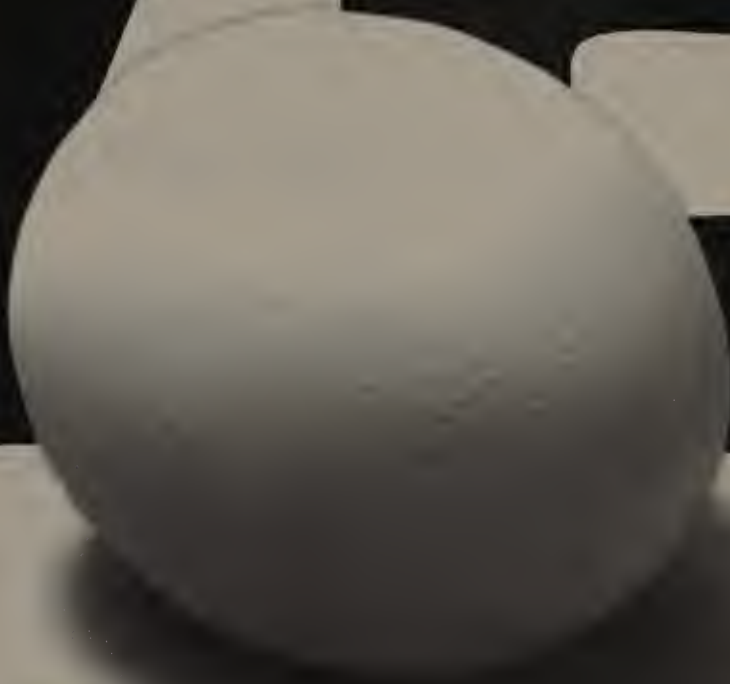
High-quality ink jet that prints at 600 by 300 dpi in color, and a fast, 8-ppm LED (laser-quality) printer.

Okidata
800/654-3282
Street price: Okijet 2010
\$399, OL810e \$799
Reader service no. 728



SUPER

SIZE



The QMS 1660E Laser Print System • \$5,999*

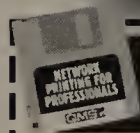
1200x1200dpi • 11" x 17" Full Bleed • 16ppm



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Circle 192 on reader service card

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The GlidePoint Desktop Touchpad Lets Your Finger Do the Mousing

Drag the mouse. Roll the trackball. Push that miniature joystick. There's no perfect input device. Enter the GlidePoint Desktop. Cirque Corporation's original GlidePoint touchpad, which interprets finger movements as cursor directions and mouse clicks, has won some popularity among notebook users and designers for its compact size and imperviousness to dirt, fluids, and mechanical failure.

The GlidePoint Desktop is larger than its predecessor—a little bigger than a business card—and adds two more programmable buttons. At \$89 list, it costs about the same as a good-quality regular mouse, but it offers users of desktop PCs an alternative to traditional mousing.

You still have to move something to control your cursor. For someone like me, who prefers the precision of keyboard commands, this remains a frustration. But with the GlidePoint Desktop, it's just your finger that moves, not an entire mouse. And you probably have more control over your finger than you do a wayward trackball or joystick. It took me a few hours to get used to gliding and tapping with my finger (it

still feels a little strange), but the touchpad thrives on gentle contact, with no pressing or pounding required. That's a relief.

Installing and programming the GlidePoint Desktop could be more intuitive. I wish all of the buttons were located on the sides, too, so my thumb—which seems the best button pusher—could reach them more easily. You might find the GlidePoint easier to use if you move your whole forearm.

The touchpad may not be for everyone. But it's a move in the right direction.

—Melissa Riofrio



THE FINGER MOUSE: The new GlidePoint Desktop provides an unconventional but slick navigation option for Windows users.

Big Picture in a Little Package

Contrary to all the marketing hype, the 15-inch monitor is not dead. While 17-inchers have received the lion's share of attention lately, 15-inch monitors still make the most sense for users without a lot of desk space. And the next generation of 15-inch displays, exemplified by Nokia's new Multigraph 449X, offers ample proof that when it comes to monitors, size isn't everything.

The 449X boasts just about every high-end spec you can find in a monitor. Start with the CRT: The Trinitron tube, with its aperture grill of phosphor stripes, provides a sharper and more consistent image than do monitor tubes that use a cheaper shadow mask of phosphor dots. The 449X has a .26mm stripe pitch, roughly equivalent to a .28mm dot pitch on standard CRTs. The monitor's maximum display area is 13.9

inches—larger than that of most 15-inch models. Thanks to Nokia's FullScreen feature, you can extend an image from edge to edge with little appreciable distortion.

The 449X supports the requisite high scan rates (62 kHz) and resolutions (1024 by 768 at a crisp 76-Hz refresh rate). It's also one of the few 15-inch monitors that comply with the tough TCO standard for electromagnetic emissions; like the MPR II standard, TCO limits monitor emissions but measures them closer to the monitor than the laxer MPR II does.

Like many recent monitors, the 449X offers on-screen controls, and it supports more adjustments than most displays. In addition to the usual controls—brightness, contrast, image size and position, pincushioning, and image tilt—you can control a number of screen

Nokia Multigraph 449X

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Nokia Display Products

800/296-6542

List price: \$625

Reader service no. 730

characteristics, such as focus, contrast, and horizontal and vertical convergence.

The only hitch is price. At \$625 list, the Nokia Multigraph is as expensive as some 17-inch displays. Still, this 15-inch device gives you the professional image quality of a 20- or 21-inch monitor.

So if image quality is important to you, but you don't want to spring for a jumbo display, the Nokia Multigraph 449X is worth checking out.

—Dan Miller

GlidePoint Desktop

Cirque's popular touchpad comes in a larger size for use with a desktop PC.

Cirque Corp.

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801/467-1100

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8:30 AM



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11:16 AM



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6:11 PM



On the plane:

For extra long life, swap the floppy drive and internal AC adapter modules with the Nickel Metal Hydride (NiMH) and lithium ion battery* packs.

9:42 PM



At the hotel:

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Get Your PC Primed for Windows 95

TouchStone Software's newest utility answers one of the thorniest computing questions you'll face in the coming months: "Is my system ready for Windows 95?" If the answer is yes, Win'95 Advisor assists with installation, notifies you of potential problems, and benchmarks your system's performance before and after installation so you can compare it to determine whether you should revert to Windows 3.1.

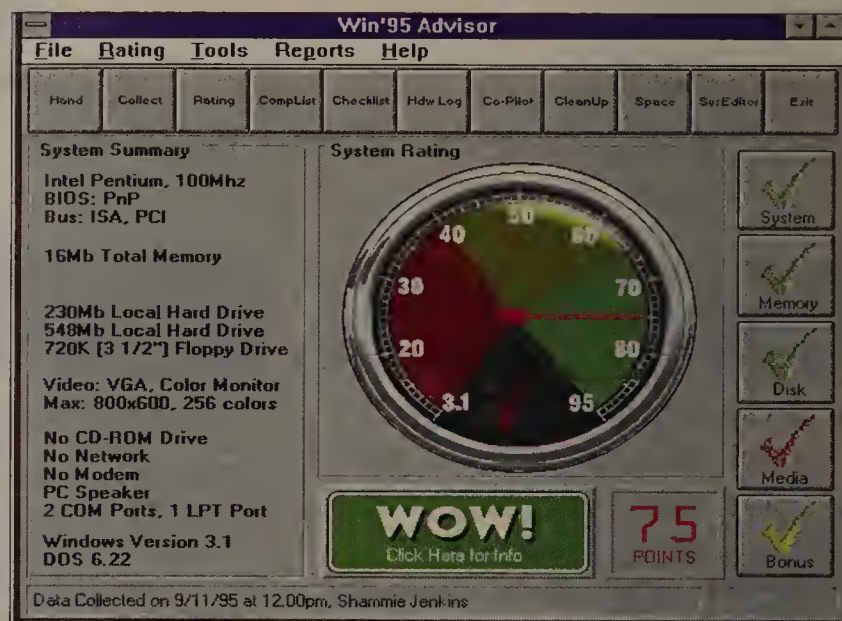
Largely a Windows 3.1 application, Win'95 Advisor first collects data about your system and analyzes it, then tells you what you need to do to prepare your PC for Windows 95. For example, it tells you whether Windows 95 supports attached peripherals or if there may be problems with your BIOS. The Installation Space Planning module determines how much disk space you'll need, based on such factors as whether you'll perform a minimum, typical, or complete Windows 95 installation and whether you're installing Windows 95 alone or over another version of Windows.

Next, Win'95 Advisor prepares for the installation, helping you answer the questions Windows 95's setup program

will ask you later. The program then generates a batch file that automatically feeds your answers to the Windows 95 setup program at installation, which reduces setup time.

Furthermore, you can use Win'95 Advisor's batch file over and over again. So should you choose to repeat your installation or find yourself with an incremental release of Windows 95 in the future, you don't have to answer the setup questions again. Network administrators can also use the batch file if they need to perform multiple installations of your company's standard Windows 95 setup.

Once you've successfully installed Windows 95, Win'95 Advisor runs benchmarks com-



AFTER WIN'95 ADVISOR ANALYZES your system configuration, it rates how well prepared your PC is for Windows 95.

paring your current system with your system before the installation. (The results can tell you if you need to tweak your

Windows 95 setup or if you would be better off reverting to your old setup altogether.)

—Shane Rau

Common Ground 2.0: Significant Improvements

When you send a file to clients or coworkers, how do you make sure they can see and read your work?

You use a program like Common Ground 2.0. Similar to Adobe's \$195 Acrobat 2.0, the de facto standard in this market, the \$189 Common Ground creates what it calls a Digital Paper (DP) document that other users can access even if they don't have the native application. It's simple for users to create a DP file as well.

Although not complete in my beta copy, the program's PostScript Level 2 support lets you create a DP file from any application that can output a PostScript file, the vendor says. This capability will be built into Common Ground 2.0, un-

like the separate Distiller package required with Acrobat 2.0 for processing PostScript files (it's bundled with Acrobat's \$595 Pro version). Making a comparison of how well each program handles different types of files is essential before choosing among this class of products, which also includes WordPerfect's \$189 Envoy.

New features in Common Ground 2.0 let you quickly make annotations, create hyperlinks, and fashion a table of contents to guide the receiver through the file. The program can also encrypt documents.

If your target audience does not have Common Ground installed, you can embed a viewer module into files you send them. (Envoy also offers an

embeddable viewer; Acrobat requires a separate but freely distributable viewer.) Common Ground's Verity indexing engine lets you organize DP files into collections for quick text searches across multiple documents. (Acrobat 2.0 also has this feature.)

—Peter Scisco

Common Ground 2.0

Share electronic documents with others regardless of their platform or application.

Common Ground Software

800/598-3821,

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List price: \$189,

upgrade \$39

Reader service no. 700

Win'95 Advisor

Examines your system and helps determine if it's ready for Windows 95.

TouchStone Software Corp.

800/531-0450,

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Two Upgrade Paths for DOS Database Diehards

Even the Windows-dominated PC environment of today, many people are still using a DOS database program. Some of them have invested lots of time and money to develop these databases and don't plan to upgrade until there's a compatible Windows product. Other users prefer the speed and efficiency of character-based DOS programs. The latest packages from veteran database developers DataEase International and Alpha Software offer new options for DOS holdouts.

The DataEase Windows Upgrade

Fans of DataEase have waited a long time for a full-fledged Windows version of the programmable, relational DOS database. While DataEase International already offers a product called DataEase Express, its new DataEase 5 for Windows is the first Windows edition of DataEase that's comparable in features to the DOS version.

The cross-platform capabilities of DataEase for Windows allow it to shine in some situations where Windows-only products, such as Microsoft Access and Lotus Approach, can't do the job. Its data files are compatible with DataEase 5 for DOS and OS/2, so you can construct multiuser databases that users of all three operating environments can share; a special manual discusses cross-platform concerns and provides advice for users who need to bring older DOS databases into Windows.

Thanks to the Windows interface, setting up forms and



USE DATAEASE 5 FOR WINDOWS to quickly and easily design attractive forms that include buttons, menus, and other controls.

reports in DataEase is particularly easy using the desktop publishing-like tools that let you arrange fields, graphics, and even embedded OLE information from other applications by simply pointing and clicking. The package also includes a utility that lets you design databases by mapping out their structure as a flowchart-style diagram.

Despite such helpful features, though, DataEase does not offer much in the way of online assistance and automation. It lacks step-by-step guidance features like Access's Wizards, and you need to delve into its DataEase Query Language if your database-design ambitions go very far. For these reasons, it's much better suited to users with some previous database experience than it is to complete beginners.

For Alpha's DOS Hard-Liners

Alpha Software gave users of its DOS-based Alpha Four database a doorway into Win-

dows last year, with its Alpha Five. But rather than forcing DOS loyalists to go the Windows route, the company has unveiled Alpha Four Version 6.0, a powerful DOS upgrade.

Power Without Programming

Like DataEase, Alpha Four lets you create fully relational, customized database applications, but it enables you to go remarkably far without programming. By defining Field Rules—instructions for what the program should do with the data that's stored in each database field—you can create sophisticated applications without writing a line of code.

Alpha Four databases can now contain up to 255 fields, versus 128 in the prior version; database memo fields can hold up to 20,000 characters—a capacity that puts some Windows-based products to shame. The new version also adds the ability to work with The Address Corrector, Alpha's \$59 DOS-based CD-ROM that

helps ensure that addresses in your databases really exist and that they're spelled and abbreviated accurately.

One of Alpha Four's few Windows-like touches enables you to create databases with multiple forms that users can move between by clicking on tabs, similar to the tabbed interfaces that are popular in Windows applications.

Windows-based products such as Approach and Access have made great strides in bringing powerful database features to nonprogrammers, and Alpha Four no longer seems as impressively simple as it once did. But if you need to create serious database applications that will run well on a 386 PC with 4MB of RAM—or if you are simply a hidebound DOS traditionalist—this upgrade is worth investigating.

—Harry McCracken

Alpha Four Version 6.0

DOS database adds powerful new features and an address-checking option.

Alpha Software Corp.

800/852-5750,

617/229-2924

List price: \$149, upgrade \$79

Reader service no. 695

DataEase 5 for Windows

Windows database with DOS and OS/2 cross-platform compatibility.

DataEase Int'l

800/243-5123,

203/374-8000

List price: \$495,

upgrade \$195

Reader service no. 696

Ecco Professional 3.0: Breakthrough PIM

After only a week of using Ecco Professional 3.0, I'm hooked. Already one of today's most customizable personal information managers, Ecco now boasts a simplified interface that makes it much easier to use. Behind its pretty new face, the program offers more capabilities than most popular PIMs and contact managers. Ecco Professional 3.0, now owned by NetManage, offers various other improvements, including the addition of unique communications features, and a lower price. Ecco Professional 3.0 should sell for around \$99—about \$100 less than its predecessor.

Ecco lets you organize every scrap of information, from contact records to word processing files, in folders. While the previous version of Ecco presented you with confusingly empty screens to which you added folders of information, Ecco Professional 3.0 keeps the folder structure but gets you organized using metaphors anyone can understand: a Rolodex for phone calls, a yellow notepad for tasks and notes, and a Day-Timer for scheduling.

In addition, Ecco Professional 3.0 is very customizable. Tabs along the bottom of the screen hold work modules—calendar, phone book, calls,

project files—and you can name and arrange the tabs to suit the way you work.

Ecco Professional 3.0 is also the first PIM that helps you get a grip on the Internet. It ships with an Internet Address Book of more than 2000 Internet sites, organized by category. You can add your own sites to this list and then keep notes on them. For workgroup use, Ecco seems hard to beat, with real-time group scheduling, the ability to share folders among group members, and file synchronization.

—Laurianne McLaughlin



ECCO PROFESSIONAL 3.0 sports a simplified interface that gets you organized with yellow notepads and Rolodex-like cards.

RAM Compression for Better Performance

The idea is brilliant: By compressing data going to RAM, you can make your system run faster and function as if it had more memory.

That's the idea behind Landmark Research International's MagnaRAM, one of the first Windows programs to attempt this prodigious feat. Though the late beta version I looked at was still a little rough around the edges, similar products have been popular in the Macintosh environment and could do well for PC users.

Here's how it works: Insufficient memory often forces Windows to swap data out of RAM to your hard disk. MagnaRAM intercepts data as it goes back and forth between the Windows memory manager and the Windows swap file on your hard disk. MagnaRAM compresses the data in memory, allowing more of it to fit, a

scheme that can prevent the need for swapping.

All compression with MagnaRAM takes place during CPU idle time, so the product is not supposed to degrade the performance of your programs. However, MagnaRAM did slow down my system. Apparently, a feature in my beta version that was disabled caused the program to waste CPU cycles by continually compressing data in memory, even when plenty of unused RAM was available. The vendor expects to fix this problem.

Even with the flaw fixed, users should still be realistic in their expectations. Landmark Research contends that MagnaRAM will boost effective memory by two times or more. But the product will not necessarily let you load more programs simultaneously: The limitations of Windows' system

MagnaRAM 1.0

A relatively inexpensive option for getting more out of your existing RAM.

Landmark Research Int'l

800/683-6696,

813/443-1331

Street price: \$69

Reader service no. 698

resources often come into play before you run out of memory.

MagnaRAM is also supposed to improve performance regardless of how much physical RAM you have installed on your system—so long as you load enough programs or large enough files to force Windows to swap data to disk. If you have 8MB or more of memory and typically don't overload it, you may not notice significant improvements.

—Reid Goldsborough

Ecco Professional 3.0

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NetManage Inc.

206/885-4272

Street price: \$99

Reader service no. 697

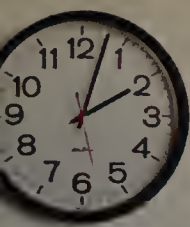


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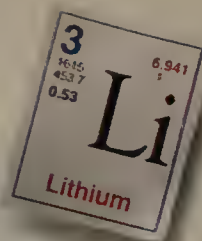
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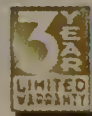


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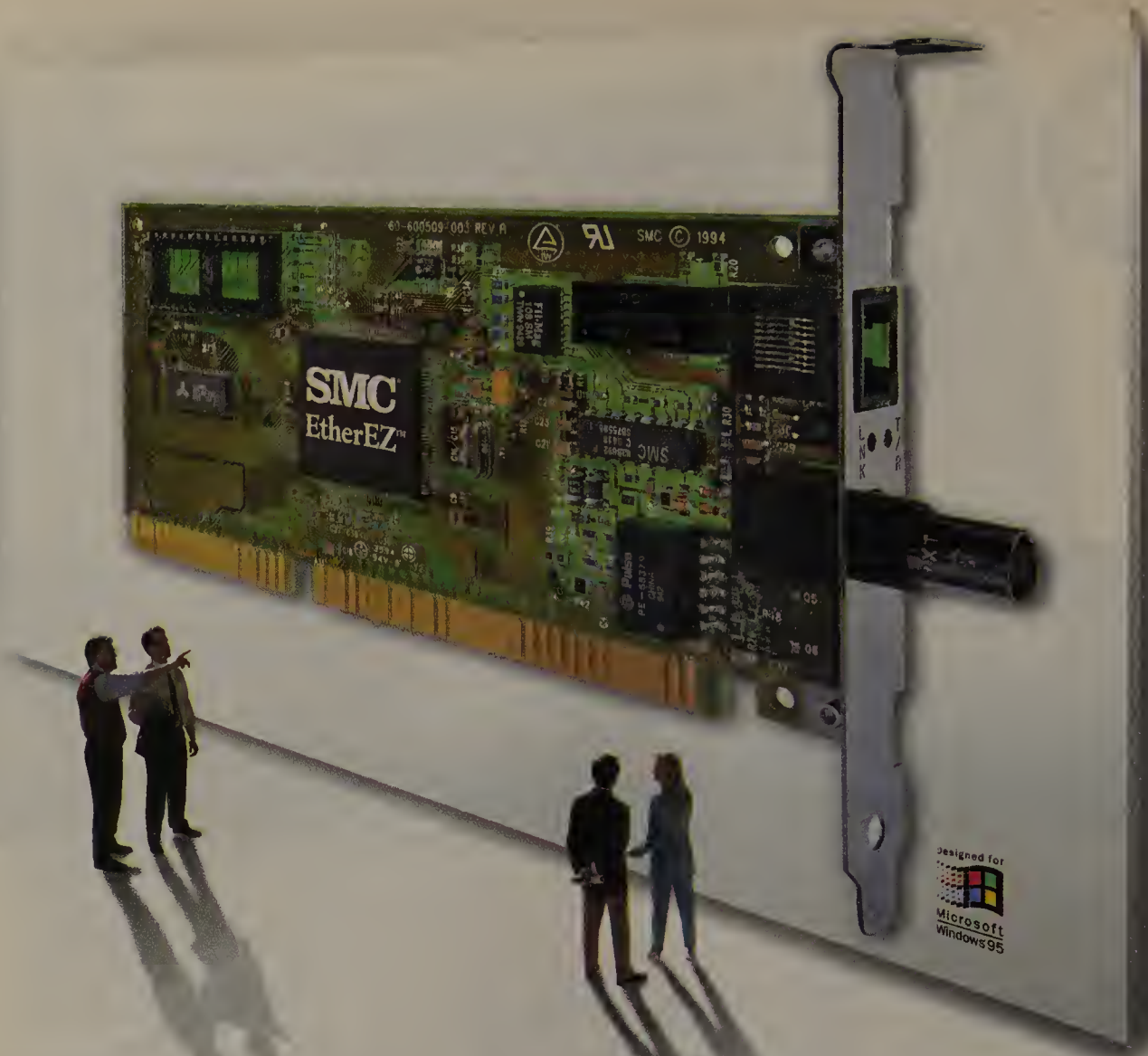


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*If, as an end-user, you are not satisfied with SMC EtherEZ, SMC will replace it with your choice of an SMC 16-bit ISA Elite or Ultra network card. Guarantee valid on end-user EtherEZ purchases made between June 1 and August 31, 1995, subject to terms and conditions. All replacement claims must be received by September 30, 1995. For complete information, call 1-800-SMC-8329, and ask for document 5601.

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WinWay Resume 3.0 Offers Tools and Tips for the Job Search

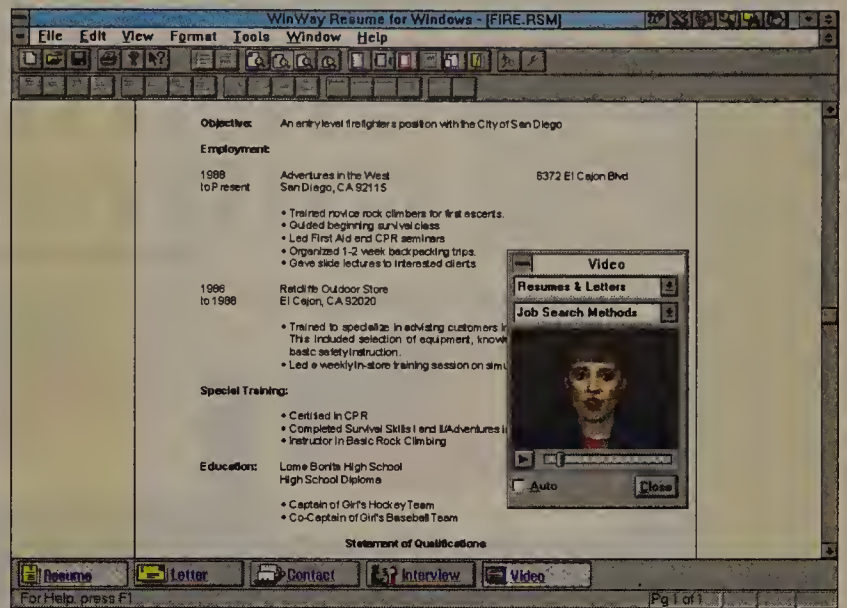
Think of this CD-ROM as a down payment on a new job. Expected to sell for \$40, WinWay Resume 3.0 helps you write résumés and cover letters, prepare for interviews, and manage your search.

The résumé writer—a sophisticated word processor—features a palette of layouts and

a spelling checker. Suffering from résumé writer's block? You can activate the Auto-Writer feature and then scroll through a list of stock phrases. A cache of sample résumés and cover letters includes examples for hundreds of positions and professional fields. For people who feel uncomfortable writing, these will be helpful.

The disc also provides a simple contact manager that tracks names and contact information and performs mail merges.

With 3 hours of full-motion video clips and sound, this CD-ROM includes several hundred tidbits of résumé and interview advice. There's also some hard-nosed salary negotiation advice. Even the happily



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WinWay Resume 3.0 works

best if you're looking for your first job or feel uneasy about today's tight job market.

—Richard Overton ▶

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WinWay Corp.

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Street price: \$40

Reader service no. 705

How Do You Run More Applications In Windows?

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System Requirements: A PC equipped with a 386, 486, Pentium or equivalent processor • Windows 3.1 or 3.11, Windows for Workgroups 3.1 or 3.11, running in 386 enhanced mode • 4 MB RAM required, 8 MB RAM recommended • RAM Doubler for Windows works in tandem with any DOS memory extender, such as QEMM or Netroom.

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Circle 96 on reader service card

Model 2010 20 inch Color Monitor

18.8" viewable image size; digital on-screen controls include RGB, color temperature, zoom and tilt; 30 memory settings (18 user storable); anti-reflection, anti-static coating (AR-ASC); .28mm dot pitch; dynamic focusing; up to 1280x1024 @ 77 Hz, flicker-free; auto-scan to 1600x1280 NI; MPR II compliant; VGA and BNC inputs.

Model 1727 17 inch Color Monitor

FST, 16.1" viewable image size; digital on-screen controls include zoom, tilt and auto diagnostic; 34 memory settings (27 user storable); non-glare, anti-static coating; .28mm dot pitch, dynamic focusing; up to 1024x768 @ 76 Hz, flicker-free; auto-scan to 1280x1024 NI; MPR II compliant.

Model 1527 15 inch Color Monitor

FST, 14" viewable image size; digital on-screen controls include RGB, color temperature and zoom; 40 memory settings (32 user storable); non-glare, anti-static coating, .28mm dot pitch; up to 1024x768 @ 76 Hz, flicker-free; auto-scan to 1280x1024 NI; MPR II compliant.



Dream Job CD-ROM: Deep Thoughts on Careers

If you want to get more out of work than just a paycheck, Create Your Dream Job may help you. It helps clarify what you'd like most in a job by probing your psyche with questions about your dreams, desires, and values. Unfortunately,

the disc is far from ideal.

The program's queries are categorized into four sections: talents, passion, environment, and vision. Questions such as "What do you do in your leisure time?" and "Where would you like to volunteer?" help steer your thoughts toward hobbies. You are asked about which movies and books you like, to help pinpoint your interests. Most questions focus on what you value in a job—whether it's adventure, independence, or status.

The program has some real drawbacks, however. Though it presents an on-screen questionnaire for putting your thoughts together, you must write your answers on paper.

Create Your Dream Job

Self-help CD-ROM about careers falls short.

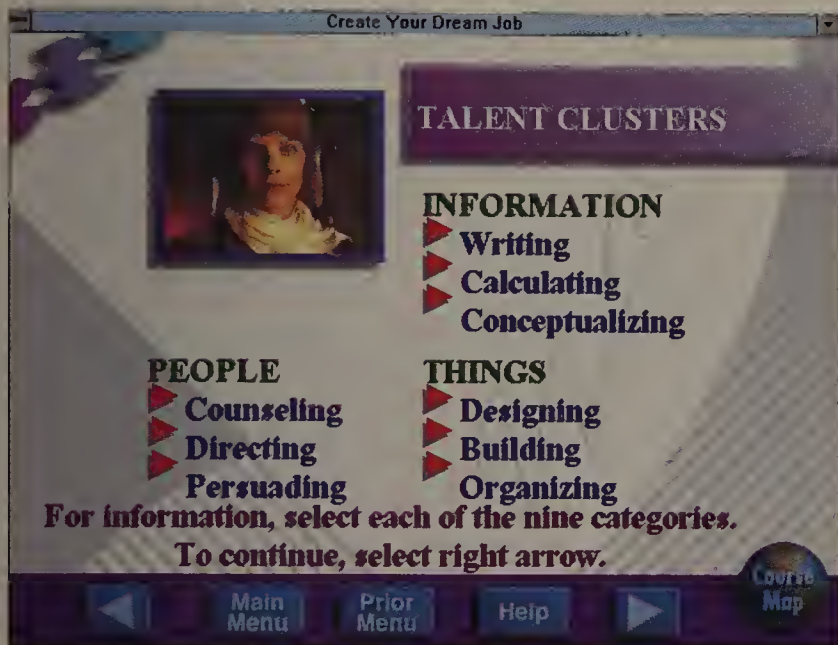
Wilson Learning

800/247-7332,

612/944-2880

List price: \$69.95

Reader service no. 706



CREATE YOUR DREAM JOB is a questionnaire that helps you discern hidden career desires. The disc has poor-quality video, however.

And you get basic advice but no details on specific careers.

Also, the video clips add little value—they're blurry and simply show someone reading the on-screen text. Instead of buying this disc, you could schedule an appointment with a career counselor. Or you could buy a book and save money.

—Arden M. Hoffman ▶

What Would You Call A \$100 Digital Camera?

Video Magic.

QuickCam™ includes all you need to make movies and take pictures with your PC. Plug one cable into your parallel port, install the software and shoot. It's simple. Make training films, video conference, inventory valuables. It's easy to take pictures, too. Add photos to newsletters, documents, reports. QuickCam comes with Movie AVI for Windows, QuickMovie software, QuickFrame templates and QuickPicture image saver. All for around \$100. Your satisfaction is guaranteed. Buy your QuickCam today wherever fine computer products are sold.

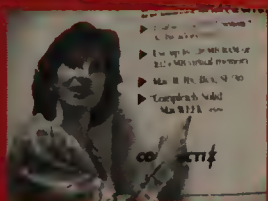


System Requirements: A PC equipped with a 386, 486, Pentium or equivalent processor
• Windows 3.1 or 3.11, Windows for Workgroups 3.1 or 3.11 • 4 MB RAM required



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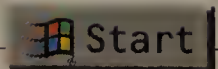
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New Remote Control Products Offer Value and Performance

With remote control software, as in life, you get what you pay for. Take the latest versions of two products in this category: Microcom's \$199 Carbon Copy 3.0 for Windows and Triton Technologies' \$99 CoSession 2.0 for Windows.

Basic Similarities

Both products offer the key features you expect. Both have friendly Windows interfaces that let you easily use your home PC to dial in to your office PC and take control of it, run programs stored on the office PC, and send files to its hard drive and retrieve files from it. Both programs let you share disks on connected PCs, so you can, say, modify a file on your office PC from home without having to transfer it,

edit it, and transfer it back again. Both programs are quick and easy to set up and uninstall.

But the similarities end there. Version 2.0 of CoSession for Windows is \$100 cheaper than its predecessor. The higher-priced Carbon Copy offers additional features that make it faster and easier to use and allow it to run under Windows 95 as well as Windows 3.x.

A Good Value

At \$99, CoSession 2.0 for Windows costs about half the price of most other remote control products, and its key features, such as remote control, chat, and file sharing, work well. This update adds features found in competing products, including remote control connections across LANs and support for 24-bit (16.8 million) color displays. File transfer is fast, and security features let you restrict access to directories on host systems.

But there are a few trade-offs. Though CoSession works well under Windows, the host system must run a DOS TSR (terminate and stay resident) program, which functions deep in the operating system and creates complexities that prevent the product from running well under Windows 95. And the TSR hogs a hefty 88K of base memory—as much as some full-scale network operating systems. Another hitch: Controlling a remote host that



MICROCOM'S CARBON COPY 3.0 remote control program offers a plethora of new features, including remote printing and support for Windows 95.

has a higher screen resolution than your system's requires you to scroll portions of the desktop, with no option to squeeze it to fit on lower-resolution monitors. And running an application remotely can be maddeningly slow.

A new version, due in September, should bring CoSession up to par, with Windows 95 support, no TSRs needed to run Windows 3.x (although a more compact TSR will still be included for connecting to systems that run DOS only), performance enhancements, and a connection for TCP/IP networks.

The Bells and Whistles

Among its many other new and enhanced features, Carbon Copy 3.0 for Windows offers the capability to share printers between connected systems. And because it's a Windows 95 application, it can detect and configure your modem precisely through a Modem Wizard. (This feature was not available in the beta version that we reviewed.) In addition, the prod-

uct runs in Windows memory, which should limit conflicts with TSRs and special device drivers.

Carbon Copy's ability to output to a remote printer will be a boon to anyone who has to work on a document at home but needs to print it out at the office. Also, when you're controlling a remote PC with a high-resolution display, Carbon Copy offers two viewing options. You can either display documents at the higher resolution, which requires you to scroll around the screen to read it, or squeeze the video to fit on lower-resolution screens so you can read without scrolling. And Carbon Copy runs applications remotely at a nice clip, since it transmits keystrokes in groups instead of sending them one at a time, as CoSession does.

These products appeal to different users. For the occasional user, the lower-cost CoSession will probably fill the bill. But if you use remote control software often, Carbon Copy will be worth the money.

—Peter Loshin

Carbon Copy 3.0 for Windows

Polished and complete remote control for the road warrior or telecommuter.

Microcom Inc.
617/551-1000

List price: \$199,
upgrade \$49

Reader service no. 701

CoSession 2.0 for Windows

Inexpensive remote control for the occasional or budget-minded user.

Triton Technologies, Inc.
800/322-9440,
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List price: \$99, upgrade \$40
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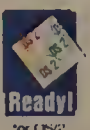
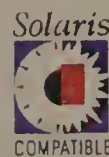
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Circle 84 on reader service card

Easy Internet Access for LANs

The Internet is hotter than a three-dollar pistol, and everyone wants in. If only it weren't so complicated, what with finding an Internet service provider (ISP), installing a router, and configuring and installing TCP/IP (the protocol that governs Internet communications) and other applications like World Wide Web browsers on each PC. It sounds confounding—and it is.

Performance Technology's Instant Internet is a solution worth considering. This \$3495 device lets you plug in a phone line through one port and a NetWare or Powerlan network through another. Then you just run a simple setup program on each PC connected to the LAN, and you're set.

Before Instant Internet, if you wanted Internet access for your office, you had two options: You could buy a separate Internet account for everyone who wanted one, along with a modem and software for each user. Or you could invest in a router, software, and an expensive dedicated link for the entire LAN. Both options created maintenance headaches for your network administrator, who also had to install and configure TCP/IP and Internet applications on each PC—a time-

consuming, messy task.

Instant Internet simplifies installation and maintenance. Your network administrator installs software on the network file server and then runs an install program on each PC connected to the network. The install program outfits each PC with icon groups for Internet applications and adds a program called Winsock. That's it—no routers, no system re-configuration, and no special Internet servers to mess with.

Instant Internet can also save you money. It lets up to 50 concurrent users on a LAN share a single Internet connection. Shipped with an internal 28.8-kbps modem, the box dials into the ISP, establishes an Internet link over the phone, and configures itself. The product includes a suite of Internet applications—such as a Web browser, E-mail, and news readers—that can be installed on each system or on a LAN server. (Users who prefer commercial Web browsers or E-mail programs can use those products as long as they are Winsock-compliant.) You will need a single dial-up Internet account and a separate POP (Post Office Protocol) mailbox account for each E-mail user.

Instant Internet simplifies Internet access, though with some limitations. While your LAN can get services on the Internet, you can't run your own Web server, for example. With networking products, performance typically degrades as you add more users. Performance may be an issue as the number of users sharing the single Internet connection ap-



CONNECT YOUR DEPARTMENT OR SMALL OFFICE to the Internet easily and inexpensively with Instant Internet.

proaches 50. If you upgrade to higher-speed service, you'll need a dedicated Internet router, too. While Instant Inter-

net may not be for everyone, it offers fast, easy, and economical access to the Internet.

—Peter Loshin

Create a Custom Newspaper

Journalist 3.0 from PointCast is an innovative program that lets you create an online newspaper covering only subjects of interest to you or your business. For example, you can track stocks or industries, or use Journalist for hourly updates on current events.

Journalist gathers news by logging in to an online service and then downloading the contents into a newsletter that you can view on screen or in print.

Version 3.0 dramatically improves Journalist's performance and ease of use. Help Wizards let you click to select the world, national, business, arts, sports, weather, and industry news you're interested in. Then you select from an array of newsletter templates. You can have Journalist automatically call CompuServe, America Online, or Prodigy while you sleep so that your newspaper is

Journalist 3.0 for Windows

Create your own newspaper from online content on America Online, CompuServe, or Prodigy.

PointCast Inc.

408/253-0894

List price: \$19.95

Reader service no. 704

waiting when you awaken. Or you might set it to obtain updates throughout the day.

The product now supports Windows' Multiple-Document Interface capabilities, so you can easily design different newspapers with different content and update characteristics. Version 3.0 also lets you build databases of articles, photographs, and stock quotes you've downloaded.

—Joe Abernathy

Instant Internet

An easy, low-cost way to connect LAN users to the Net.

Performance Technology Inc.

800/784-4638,

210/979-2000

List price: \$3495

Reader service no. 703

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hardware:



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You are not a computer geek. Which is fine. Because you don't need to be with Netscape Navigator™ Personal Edition, the world's most popular Internet Browser. With Personal Edition, getting on the Internet is easy. Just point and click to choose from a list of leading Internet Service Providers and your connection is automatically set up - even people without tape on their glasses can do it. For under \$40 at your local computer store, Personal Edition lets you access all the important Internet resources. Like the world-wide web, e-mail, news groups and FTP sites.*

Plus, it offers all the performance and advanced features that have made Netscape Navigator quite popular with the biggest brains on the web.

So if you're looking to get on the Internet and aren't partial to pocket protectors, get Netscape Navigator Personal Edition.

For more info call 1-800-473-4875



Welcome aboard. NETSCAPE

Circle 126 on reader service card



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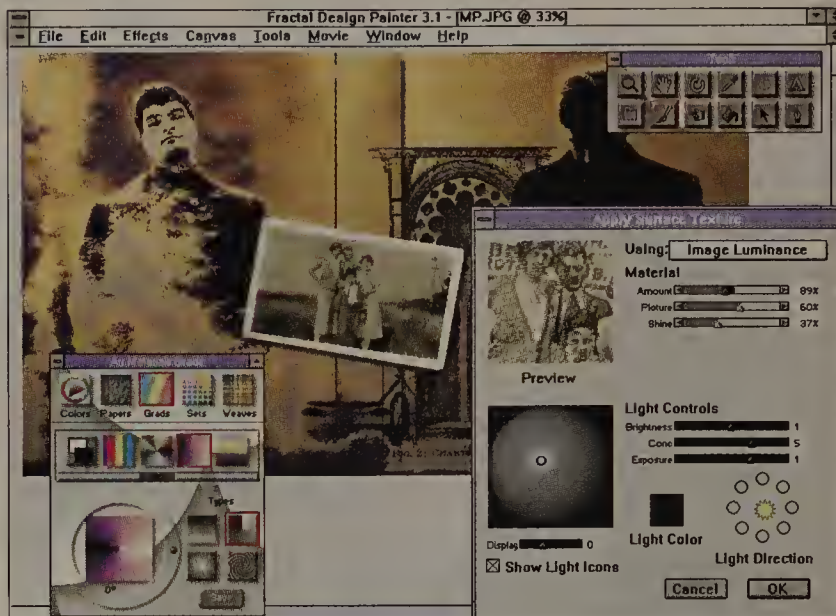
Fractal Design Painter 3.1

Quick on the heels of Painter 3.0, this new release adds polish to Fractal Design's impressive paint program. Version 3.1 makes it easier to explore creative possibilities by letting you undo multiple effects. Specifically, you can undo your last 32 steps until the picture looks good again. Another handy refinement lets you create your own color gradients, then put them into pictures for a psychedelic effect. Painter's simulation of lighting effects on image surfaces now looks more realistic. Another significant plus is Painter's broader file-format support: The program now opens and saves Adobe Photoshop 3.0's layered file format, GIF files, and JPEG-compressed files. The 3.1 upgrade is free for Painter 3.0 users. List price is \$499, with significant discounts offered to users of earlier versions of the product. Fractal Design, 800/297-2665, 408/688-8800.

Reader service no. 710

Harvard Montage for Windows

Multimedia applications can create a fine mess on your PC. Graphics, video, and sound files hide under cryptic file names. Slides you've squirreled away in presentation programs defy recovery. And even if you unearth the files, routing them to another application can be tiresome. Harvard Montage addresses this problem by letting you create catalogs of thumbnail images for easy viewing. The software automatically extracts keywords from slides in presentation programs to facilitate searches of your thumbnail



FRACTAL DESIGN PAINTER 3.1 makes imaging tricks and professional lighting easier to simulate, using the new light preview sphere.

album. Once found, an image can be dragged and dropped from the album to your target application. The program ships with a CD-ROM that provides 2000 clip art images. The street price for Harvard Montage is \$99. Software Publishing Corp., 800/234-2500.

Reader service no. 711

DeltaGraph Pro 3.5

Chart fanatics will love the latest release of DeltaGraph Pro. Name your chart type, and it's probably among the program's 63 types. Need a chart style? DeltaGraph has more than 200 to choose from. Is slicing and dicing your thing? The program lets you customize every aspect of a chart. You can rotate chart labels in 1-degree increments and 3-D charts 360 degrees. DeltaGraph Pro 3.5 is a cross-platform product that lets Macs and PCs share files, templates, and layouts created by the software. This true 32-bit app is ready to run under Windows 95 and Windows NT. The street price is \$195. DeltaPoint, 408/648-4000.

Reader service no. 712

MediaMate Cable Organizers and Speaker Stands

Look behind your computer and you'll most likely see a labyrinth of cables and electrical wires. That maze is ugly and inconvenient. MediaMate Cable Organizers provide a low-cost solution for cleaning up your cable mess. The \$9.99 pack includes two long, tube-like clamps into which you can snake most of your cables; five cord clips; two cable brackets; a mouse clip; and a cable manager. To free up more desk space, check out the company's MediaMate Speaker Stands, which elevate multimedia speakers onto your system unit. The \$9.99 shelves connect to the system by means of a set of included double-sided tape strips. Hunt Manufacturing Co., 800/446-7823.

Reader service no. 713

Vizion 1.1

Wouldn't it be great if someone could organize all that great gibberish on the Internet into a personal information manager? Sirsi Corporation has at-

tempted to do this with its Vizion 1.1, a "personal access destination management system" for the Internet—a map of sorts. Fine idea, bad execution. First of all, Vizion doesn't manage online services such as America Online, CompuServe, and Prodigy—the services many of us use to access the Net. Second, the Internet is inherently dynamic, but Vizion is hopelessly static. Its address information is outdated. And Vizion's tabs and colorful clip art just don't provide enough added value. Instead of paying \$49.95 for this product, point a Web browser at Yahoo (<http://www.yahoo.com>), a directory of updated Net addresses, for free. Sirsi Corp., 800/242-2233, 205/922-9820.

Reader service no. 714

miroconnect 34 wave

For an affordable way to upgrade your home PC's communications, telephony, and sound capabilities, check out the \$349 miroconnect 34 wave. This board integrates voice mail, fax-modem, speakerphone, and CD-quality sound functions. With its 28.8-kbps V.34 modem, you'll have the top speed—something a lot of boards don't provide—to cruise online services and the Internet. The product comes with CompuServe's WinCIM software and Spry's Mosaic Web browser. Among other helpful features, it supports a full duplex-mode speakerphone so both parties can talk at the same time, and it automatically distinguishes between data, fax, and voice calls. Also included are 16-bit sound capability (with wave-table synthesis) and CD-ROM drive inter-

What makes SAMTRON MONITORS such a great value?

QUALITY

Producing high quality monitors is our only business. In fact, our commitment to quality has been

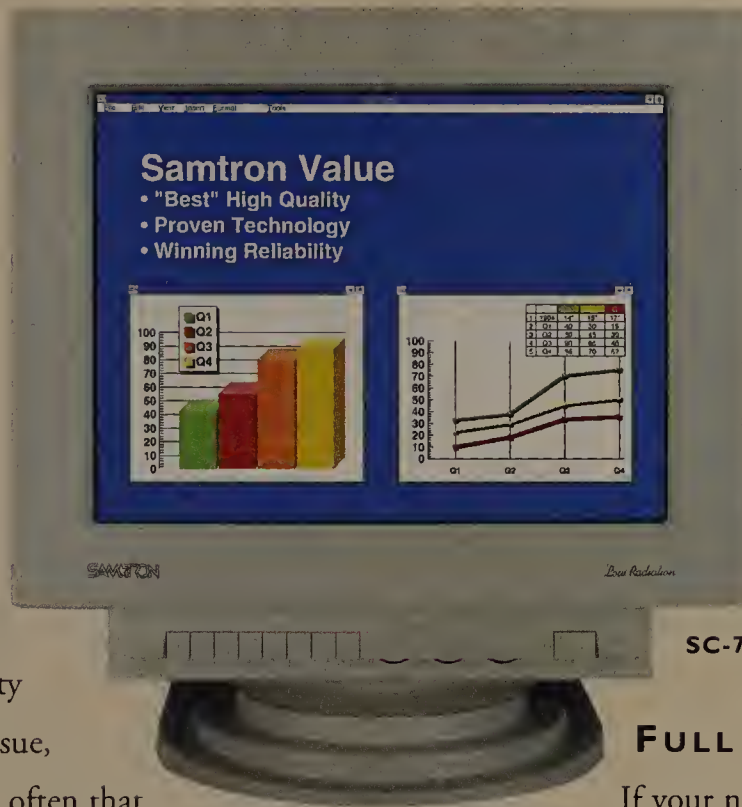
JANUARY 1995 recognized by the
BYTE leading testing
BEST HIGH-QUALITY facilities in the
17-INCH COLOR U.S. According
MONITOR to the NTSL lab report in the

January 1995 issue of BYTE magazine, "The Samtron SC-728SXL earned the best overall image quality rating". In their December 1994 issue, Windows Magazine wrote "It's not often that

WINDOWS high quality comes at a midrange price. But Samtron's SC-728SXL, with its truly flat 17-inch screen is an exception. Right out of the box, the quality of this 17-inch monitor was apparent."

TECHNICAL SUPPORT

Our commitment to quality doesn't end when you buy a Samtron monitor. Our professional Customer Service Representatives are available for unlimited technical support. Call our toll-free technical support line at 1-800-SAMTRON.



SC-728SXL

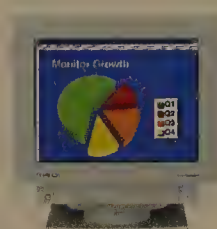
WARRANTY & SERVICE



Every monitor Samtron manufactures is backed by a 3-year Parts and 2-year Labor Warranty. Samtron "STAR" Service Centers guarantee your satisfaction by offering 48-hour turnaround warranty service*.

FULL LINE SELECTION

If your needs call for the impact of a 20" display, or the versatility of a 15" flat screen, our product line offers a full selection of high-quality monitors ideal for use in any application.



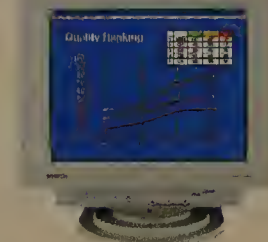
SC-528UXL

15" 0.28 Dot Pitch
 1280 x 1024 (60 Hz)
 MPR II



SC-726DXL

17" 0.26 Dot Pitch
 1600 x 1280 (60 Hz)
 MPR II Mac Compatible



SC-208DXL

20" 0.28 Dot Pitch
 1600 x 1280 (60 Hz)
 MPR II Mac Compatible

Resellers circle 204 on reader service card

SAMTRON

MONITORS WITH STARPOWER™

18600 Broadwick Street
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 Technical Support: (800) SAMTRON



*STAR Service Centers available to U.S. Customers only. The EPA Energy Star™ emblem does not represent EPA endorsement of any product or service. Specifications subject to change without notice. Screens are simulated.

Circle 213 on reader service card



faces. miroComputer Products, 800/249-6476, 415/855-0940.

Reader service no. 715

Janna Contact 2.0

This powerful, customizable contact manager makes it painless to organize and manage your contacts, related documents, schedules, and task list. For starters, you can attach all documents, such as reports, presentations, and letters, to contact names so that one double-click brings up all work related to a particular contact. You can create an unlimited number of databases for contacts, and individual contact records hold an unlimited number of customized fields and time- and date-stamped notes. The software integrates with Microsoft Mail, Microsoft Schedule+, and Delrina Win-Fax Pro. Workgroups can share contacts and schedules across popular networks. The product also has remote database synchronization features, so when you're working off site you can update contact databases and schedules. The street price is \$99. Janna Systems, 800/268-6107, 416/483-7711.

Reader service no. 716

Summagraphics SummaFlex Desktop Graphics Tablet

Whether you're painting images or tweaking a chart, expressing yourself through a mouse feels about as natural as painting with a bar of soap. Now you can turn your desk into a drawing board with the 18-by-24-inch pressure-sensitive SummaFlex graphics tablet. It fits on your desktop much like a standard blotter, you can turn it on and off as

needed, and you can choose a particular area on which to draw. The flexible, \$849 tablet has a cordless, three-switch, pressure-sensitive pen that feels like a high-quality ballpoint. With high resolution and 256 levels of pressure sensitivity, the SummaFlex lets you add your John Hancock to faxes, paint bold brush strokes, or trace details from a layout into a document on screen. Best of all, it coexists with your regular mouse. Summagraphics Corp., 800/444-3425, 512/835-0900.

Reader service no. 717

AnyTime 3.0 for Windows

At only \$24.95 on the street, AnyTime 3.0 for Windows costs less than any other personal information manager in its class. This no-fuss program lets you track appointments and contacts easily. Drag-and-drop editing and multiple viewing options make it particularly useful. (You can drag items you're not ready to organize into the Drag Net wait station, for example.) When it comes to printouts, AnyTime acts like a sophisticated calen-

dar maker, delivering more than 100 appointment and to-do templates. Throw in AnyTime's address book, autodialing, and envelope printing tools, and you've got a bargain. Competitive upgrades are also available. Individual Software, 800/822-3522, 510/734-6767.

Reader service no. 718

Accent Professional 2.0

To the more than 30 languages supported by its predecessor, version 2.0 adds support for Hebrew and both simplified and traditional Arabic, including the bidirectional text entry these languages use. In addition, the product now supports Hungarian and Danish and includes 70 additional fonts (for a total of more than 150) and integrated copies of Delrina Win-Fax Lite and Lotus Organizer. Accent Professional 2.0 lists for \$399. Accent Software Int'l, 800/535-5256.

Reader service no. 719

MediaMagic Telemetry-32

Improve the telephony capabilities of your Windows com-

puter with IPC's MediaMagic Telemetry-32 Communications Manager. The \$299 board provides you with a 19.2-kbps fax-modem, a 16-bit sound card with wave-table synthesis, a CD-ROM drive interface, and a small microphone. Its telephony software lets you automatically accept, record, forward, or route incoming calls. A 32-bit digital signal processor (DSP) handles telephony functions, including automatic sensing of fax, data, or voice calls; voice mail; remote access; full-duplex speakerphone; automatic forwarding of voice, fax, or modem calls; hold music; Caller ID support; and MPEG audio compression. List price is \$299. MediaMagic (IPC), 800/338-1571.

Reader service no. 720

Business Application Builder

Aimed at saving you hours of database development time, Business Application Builder integrates a form builder, report builder, data manager, and visual query builder for developers in Microsoft Visual Basic, C++, and BackOffice. The package is designed for greater flexibility and reuse of elements from over 30 workgroup, departmental, and enterprise databases compliant with the Open Database Connectivity (ODBC) standard. Users of the product's forerunner, Visual Database Builder, can upgrade for \$299. List price is \$799. Integra Technology Int'l, 800/842-8395, 206/688-3522.

Reader service no. 721

For more information about any product, contact the manufacturer or circle the number on the reader service card.




THE SUMMAFLEX can be rolled out onto any desktop and used as a drawing tablet and work surface.

Code Name: MON Z-mopuim

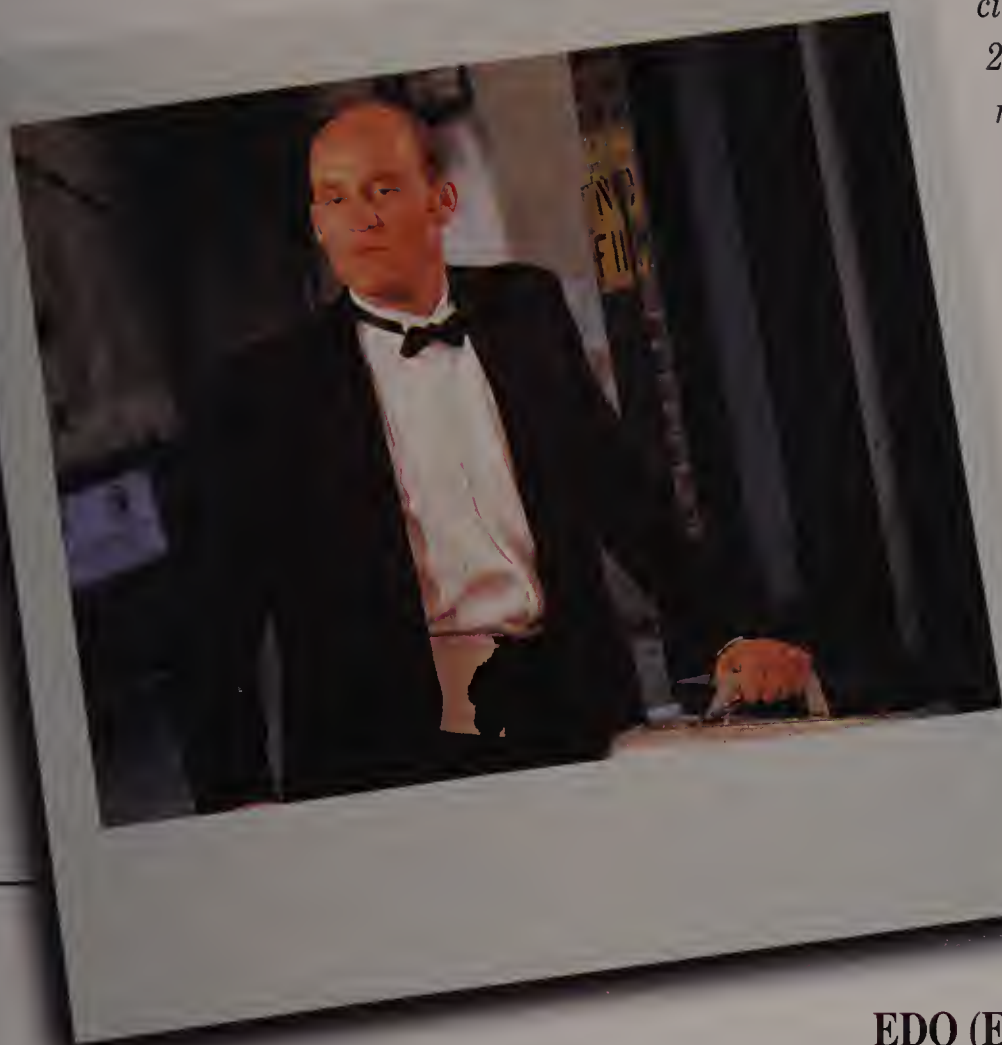


Agent 2000 Is On A Mission!

A man in a tuxedo, Agent 2000, is riding a black motorcycle on a cobblestone street at night. He is holding a large, dark net behind him. Other motorcycles and riders are visible in the background, some with their headlights on. The scene is lit with warm, orange light from street lamps and building windows.

The journey begins with the competition in hot pursuit. But it will take a lot more than they've got to overtake Agent 2000. The perfect combination of speed and power give Agent 2000 the outstanding performance to stay ahead of the pack. "I know just the trick," thinks 2000. And with that, the 133-horsepower kicks in, leaving the competitors in the dust.

The exchange went off without a hitch. Soon the city lights would be far behind. At dawn, Agent 2000 must begin the journey back. When the metallic briefcase is safely returned to headquarters in North Sioux City, South Dakota, the mission will be complete. The happiness of computer users everywhere is at stake. For in the briefcase is Gateway 2000's Secret Code — a new way to bring all PC users the latest computer technology at the best value on the planet. Undaunted by thoughts of the competitors' plans to thwart the mission, Agent 2000 keeps cool and races ahead to ensure all Gateway 2000 customers tomorrow's technology today.



The Best Performance

Gateway 2000®'s dossier is filled with accounts of great feats to bring PC users the latest computer technology and unmatched performance. It's our strategy to ensure all Gateway customers the tools to take them far into the future.

P5-133XL!

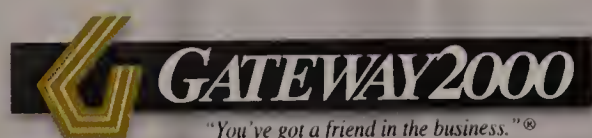
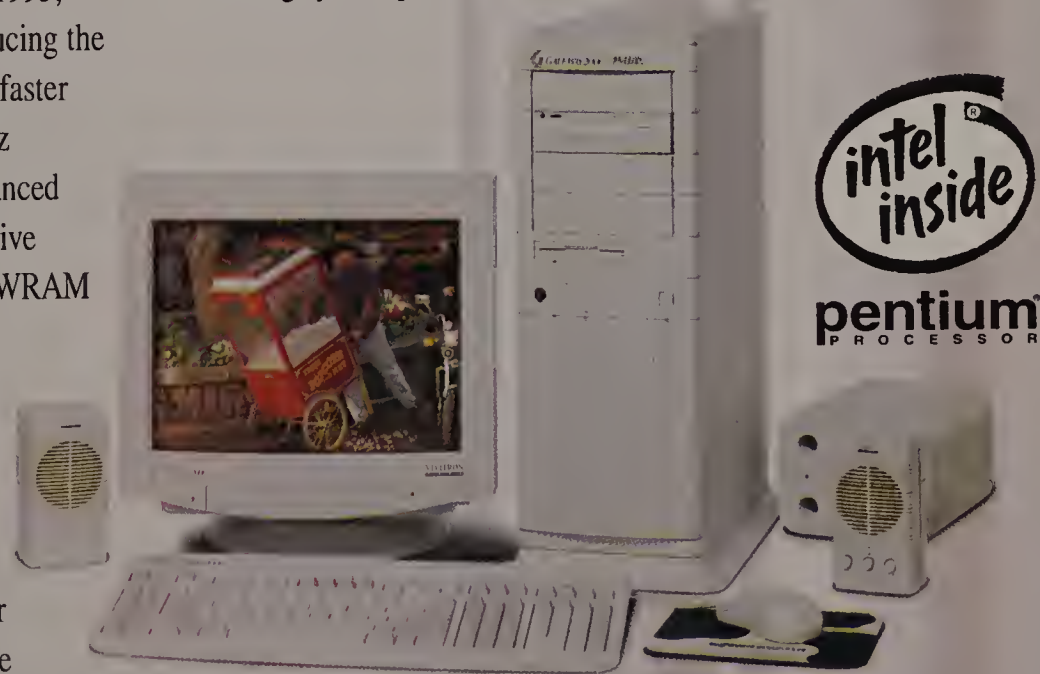
In a quest that took us to the ends of the earth, we brought you "Fastest PC in the World" — Gateway's P5-120XL (May 1995, *PC/Computing*). Now we've outdone ourselves by introducing the Gateway 2000 P5-133XL, a computer that's **significantly** faster than the fastest PC in the world! Equipped with a 133MHz Intel® Pentium® processor, 16MB EDO performance-enhanced memory, 256K pipelined burst cache, 1.62GB IDE hard drive with Mode 4 support, Matrox® MGA™ Millennium™ 2MB WRAM (Windows RAM) graphics accelerator and a 4X three-CD changer, this machine is powerful and fast enough to navigate you through any risky computing situation!

Matrox MGA Millennium

It's no secret, if you want graphics that come alive the Matrox MGA Millennium is the graphics accelerator for you! Using the latest in video and memory technology, the MGA combines a highly integrated 64-bit graphics accelerator featuring 3-D acceleration and video playback with WRAM, a fast dual-ported video memory for increased video performance. It's perfect for use with upcoming 32-bit Windows 95 applications, multimedia software or 3-D intensive applications.

EDO (Extended-Data-Out) Memory

The next time you've masterminded an unforgettable plot, you'll want plenty of memory to back you up. EDO performance-enhanced memory gives you high-speed memory for your memory-intensive graphics, demanding number-crunching applications and future multi-tasking environments like Windows™ 95. And the combination of EDO memory and pipelined burst cache, on 120MHz and 133MHz systems, gives you the latest memory technology and the performance of next-generation cache, increasing system performance up to 20 percent!



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Leaving The Comp



Speeding to the coast, Agent 2000 senses more danger. Sure enough, lying in wait under the pier are more saboteurs! Thinking fast Agent 2000 sails the bike into a passing boat. Then with a splash of incomparable speed and performance, Agent 2000 is quickly leagues ahead of the competition. "So long, shark bait!" calls 2000.

etition In The Wake ...



2000 Defends All PC Buyers!



With a flight ready for take off, Agent 2000 is sabotaged! In a flurry of arms and legs, the unworthy opponents are overthrown. They cannot defeat 2000's sheer will and determination to deliver the best features, quality and value to all PC users.

The Best Features

Gateway 2000® beats the competition to the punch with the world's best features!

TelePath 28.8™ Fax/Modem Communication Center

Access a world of information at the touch of a button using the TelePath 28.8 fax/modem Communication Center. Standard or available as an upgrade on all Gateway desktop systems, the TelePath has a 28,800bps modem and a 14,400bps fax. Combined with the included FaxWorks™ software, it provides a complete Communication Center. You get an answering machine and access to today's online world. Also included with the TelePath 28.8 fax/modem Communication Center are trial memberships to CompuServe®, America Online® and Prodigy.®

Software

You can have action and excitement for the whole family — and the tools to conquer all *your* special missions. Gateway outfits you with incomparable software applications on all our systems. Choose a Family PC™ multimedia system and be transfixed by Gateway's new Generations Software Collection including 51 software programs! Professional Gateway PCs include Microsoft® Office Professional 4.3, the world's number-one selling software suite. And all Gateway desktop PCs include MS Windows® for Workgroups 3.11 — the fastest version of Windows available (today).

Vivitron™ Monitors

Electric color, a razor-sharp focus and crystal clear images — all from a Gateway 15- or 17-inch Vivitron monitor! These monitors feature Sony® Trinitron® tube technology — technology that the most discerning viewers have relied on for decades.


The Best Service and Support

Gateway 2000 delivers another powerful blow to the competition by providing all our customers with award-winning, toll-free technical support for the life of their Gateway system! All Gateway desktop systems and monitors are also covered by a three-year limited warranty. Write or call us for a free copy of our warranty.

The Best Quality

For nearly 10 years, Gateway 2000 has prevailed when it comes to bringing PC buyers the highest-quality computer components available — the best we can possibly offer. The evidence speaks for itself with the MS Mouse, Gateway's programmable AnyKey® keyboard, and of course, our trademark cow-spotted boxes!



 **GATEWAY2000**
"You've got a friend in the business."®

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It's A Quick Getaway With



The Best Portable PCs

Don't be fooled by stripped-down portables posing as great values. They'll just leave you up in the air without the performance that you really need. Outsmart them by choosing Gateway 2000®'s high-performance portables, the Liberty™ and ColorBook.2™. They're loaded with the power to handle the increasing demands of today's (and tomorrow's) technology.

Performance

When your special assignments take you out in the field, have outstanding performance without anything to weigh you down. Free yourself with the 4.2-pound Gateway Liberty portable PC. The DX4-100 Best Buy model includes 100MHz of processing

power with 256K L2 cache for Pentium® processor-like performance. Gateway also gives you plenty of RAM that will increase battery life and improve your overall system performance! With 24MB RAM and a 720MB hard drive, the Liberty DX4-100 Best Buy gives you the speed and power to run all your hard core applications without a snag.

Features

The Liberty's sleek 4.2-pound design delivers all the goods with a 10.4-inch screen, infrared technology, an impressive battery life and incredible software applications pre-installed.

The screen display on your portable should be a crucial buying factor. Our 10.4-inch color screen on the Liberty produces vivid



Gateway 2000's portable PCs — the ColorBook² and Liberty.

GATEWAY 2000[®] LIBERTY[™]

- 4.2 Lbs., 10" x 8" x 1.6"
- 10.4" DSTN Color Display
- 1MB Video RAM
- Choice of Desktop IR Receptor or External Floppy Drive
- Intel[®] 486 DX2 or DX4 Processor
- Instant On
- Battery & AC Pack
- 2 PCMCIA Type II Slots
- EZ Point[™] Integrated Pointer
- Removable Hard Drive
- 78-Key Keyboard
- Parallel, Serial, VGA & PS/2[®] Ports
- OAG[®] FlightDisk[®], World Clock, & Ascend[®] personal information manager (PIM) for use w/ Franklin Day Planner[®]
- MS-DOS[®] 6.22 & WFW 3.11
- Microsoft[®] Windows[®] 95 Upgrade
- Microsoft[®] Works for Windows[™] 3.0 or MS Office Professional 4.3**

LIBERTY DX4-100 Base

10.4" DSTN Color Display, 8MB RAM, 340MB HD, MS Works

\$2999

LIBERTY DX4-100

10.4" DSTN Color Display, 16MB RAM, 540MB HD, 256K L2 Cache, MS Works

\$3749

LIBERTY DX4-100

Best Buy 48-Hour QuickShip*

10.4" DSTN Color Display, 24MB RAM, 720MB HD, 256K L2 Cache, TelePath[™] 14.4 XJACK[®] Fax/Modem, Leather Carrying Case, Desktop IR Receptor, External Floppy Drive, MS Office Professional 4.3**

\$4499

COLORBOOK^{2™}

- 5.7 Lbs., 11.65" x 8.5" x 1.77"
- 10.3" DSTN Color Display
- Intel 486 DX4 Processor
- Minimum 8MB RAM (expandable to 24MB)
- 1.5MB Video RAM (includes 512KB cache)
- Removable Hard Drive
- 3.5" Diskette Drive
- Integrated 16-Bit Sound and Speaker
- Battery & AC Pack
- EZ Point Integrated Pointer
- 2 PCMCIA Type II Slots
- 85-Key Keyboard
- Parallel, Serial, VGA & PS/2 Ports
- MS-DOS 6.22 & WFW 3.11
- Microsoft Windows 95 Upgrade
- MS Works for Windows 3.0 or MS Office Professional 4.3**

COLORBOOK² DX4-100

Deluxe

16MB RAM, 540MB HD, Port Replicator, Carrying Case, MS Office Professional 4.3**

\$3499

COLORBOOK² DX4-100

Best Buy

24MB RAM, 720MB HD, TelePath 14.4 Fax/Modem, Carrying Case, CD-ROM, Port Replicator, MS Office Professional 4.3**

\$4499

LIBERTY PROFESSIONAL PACK

MS Office Professional 4.3, PCMCIA TelePath XJACK 14.4 Fax/Modem, Extra NiMH Battery, Leather Carrying Case

\$449

**48-Hour QuickShip program applies only to the Liberty DX4-100 Best Buy configuration. Your PC will be delivered within two business days from the time of order. No additions or deletions can be made to the configuration. Available for approved credit card orders only while quantities last. Domestic U.S. orders only. Call us for details about other QuickShip offers.*

***MS Office Professional 4.3 includes Word, Excel, PowerPoint[®] presentation graphics program, and Access[®] database. Available only at the time of purchase.*

 Toll free from Canada
800-846-3609

 Toll free from Puerto Rico
800-846-3613

SERVICE AND WARRANTY

- Lifetime portable-specific toll-free service and support
- One-year limited parts warranty
- 30-day money-back guarantee
- Special VIP warranty. We'll ship a replacement to you within 24 hours during warranty. Only available at the time of purchase for an additional \$100.

PERIPHERAL OPTIONS

- Panasonic[®] KXL-D720 external CD-ROM drive \$299
- ColorBook² port replicator \$49
- PCMCIA 14.4 XJACK send/receive fax/modem \$159
- PCMCIA network adapters, twisted pair \$129
- Coaxial adapters \$159
- Token Ring adapters \$399

PORTABLE SALES

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610 Gateway Drive • P.O. Box 2000 • N. Sioux City, SD 57049-2000 • Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 800-846-4526
Component Add-On Sales 800-846-2080 • Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (CDT)

Gateway 2000 Portables!



color, brightness and clarity. You'll also find that the 10.4-inch screen has 23 percent more viewing area than a 9.4-inch screen, allowing you to see more spreadsheet cells, full word processing documents, and giving you the ability to read small fonts better.

The Gateway Liberty adds even more mobility with its infrared (IR) technology. Using wireless file transfer, you can transfer files between your Liberty and desktop (or between two Liberty PCs!) without cables. IR is also important for tomorrow's portable computing needs. Windows® 95 was engineered with IR in mind, and IR-ready printers will be available soon.

Not enough battery life and suddenly your portable PC isn't much help. The Liberty gives you battery life of up to four hours or

more with power management. It was also designed to be upgradable to lithium ion batteries.

The value of your Gateway portable PC goes up, up, up with pre-installed software applications. All Gateway portable PCs include Microsoft® Works for Windows® 3.0 or MS Office Professional 4.3 pre-installed. You also get the OAG® FlightDisk,® World Clock, and Ascend® software applications.

Looking for ways to make your getaways more productive? Call a Gateway 2000 portable sales representative today!

When we last saw Agent 2000, a.k.a. Undercover Agent Monique, she had just arrived at Gateway 2000 headquarters with the metallic briefcase containing the Secret Code. Safely inside President Ted Waitt's office, she removed her mask and boldly revealed her true identity. They then waited for the time-release lock on the briefcase to open.

"Ted!" exclaimed Monique, "The time-release lock has finally opened!" Ted and Monique open the briefcase to find an encrypted CD. They quickly pop it into a CD-ROM drive and discover — "AZMEJMTGKCNMRXJ." "Quick Monique, this code is hot, hand me my code book! — Ah, here it is ..."

PC buyers, the wait is over! Microsoft® Windows® 95 is now included with every Gateway 2000 system at no extra cost, and it will be sent to you upon release. If you already own a Gateway PC, you can order a Windows 95 upgrade on CD today for only \$99!

Gateway 2000 has worked tirelessly to prepare for the unprecedented release of Windows 95. We've readied our product line by loading cutting-edge technology into value-packed systems optimally configured to run this new operating system.

With Windows 95, your PC will become easier to use, faster and more powerful than ever before. And you can enjoy the benefits of true multitasking and "Plug and Play." We will provide toll-free Windows 95 technical support including installation, configuration and problem-resolution assistance to customers who purchase Windows 95 from Gateway. The best hardware to run Windows 95 combined with phenomenal service — a Windows 95 deal like this can only be found at Gateway 2000!

"Holy cow, Ted! Gateway's Windows 95 program is ground breaking, just like our next mission — making Gateway 2000 an industry leader in service and support. Extended service hours and next-day replacement parts are just the tip of the iceberg! Gateway's new service plan ..."

"Monique," interrupted Ted, "there are two things I know for sure — Gateway 2000 is the best place to buy a PC on the planet, and the Secret Code is disintegrating and eating a hole in my desk!"



"You've got a friend in the business."™

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ALL THE GATEWAY GOODS!

Incredible values from Gateway 2000®. Peripherals and software sold only with the purchase of a system.

Communications & Storage

TelePath™ 28.8 Fax/Modem Communication Center

Revolutionize your communication needs with the TelePath 28.8 fax/modem Communication Center. Internal fax/modem, 28,800bps modem, V.34, with 14,400bps fax capability. Sends and receives faxes, and sends and saves voice messages. Includes CD containing CompuServe®, Prodigy®, and America Online® trial memberships. **\$149** (TelePath 14.4K Fax/Modem \$79)

Colorado Memory Systems® Jumbo™ 1400 TBU

CMS Jumbo 1400 internal tape backup unit with up to 1.36GB compressed (680MB native) storage capacity per tape. Comes with MS Windows™ and DOS® software; one tape and cable. **\$199**

Multimedia

New 4X Three-CD Changer

Enhance the value of your PC with the 4X three-CD changer. It supports multi-session photo CDs and XA format, enabling simultaneous audio and data with additional hardware. You'll have access to three times the amount of information of a regular CD-ROM drive and the ability to switch between programs.

\$100 (upgrade from 4X CD-ROM)

\$150 (upgrade from 2X CD-ROM)

Audio Multimedia Kit

Here's everything you need to add multimedia to a Gateway PC.

- Gateway 2000 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
 - 2 Altec™ Lansing ACS-5 speakers
- \$99** (with system purchase)

Wavetable Audio Multimedia Kit

Once you've heard wavetable audio, basic audio will never do!

- Ensoniq® Soundscape™ 16-bit wavetable sound card, MT-32 and FM mode compatible. Supports most software for popular sound cards and standards including General MIDI, Sound Blaster, AdLib, Roland MPU 401, MS Windows Sound System and MT 32
 - New Altec Lansing ACS-31 three-piece speaker system
 - Blue Ribbon Sound Works' SuperJAM! jr. software
- \$209** (with system purchase)
\$110 (upgrade from systems with 16-bit sound card and Altec speakers)

Networking

3Com® Ethernet Adapters

High-performance 16-bit Ethernet cards.

16-bit Triple Media Card with BNC, AUI and RJ-45 connectors **\$109**

16-bit Card with only RJ-45 connector **\$89**

SMC® PCI Ethernet Adapter

32-bit card with both RJ-45 and BNC connectors **\$149**

Olicom Token Ring Adapter

16/4 ISA Card with STP and RJ-45 connectors **\$279**

Call the Gateway 2000 special component add-ons division at 800-846-2080 for our complete line of extras for Gateway customers.

Sales hours: 7am-10pm Weekdays (CDT).

Software

Microsoft Windows 95 Upgrade

Call today and order your copy of Windows 95, Microsoft's new operating system, on CD (shipped after its release). You won't be charged until it ships. Offer good through December 31, 1995. **\$99** (Windows 95 on diskette, \$109)

Special Starter Pack

Tuneland™, Mad Dog McCree™, Mayo Clinic® Family Health Book, Better Homes and Gardens Healthy Cooking CD Cookbook™, The Lawnmower Man™, Sitting on the Farm™, CD Deluxe Pack 1.0 MPC including Mavis Beacon Teaches Typing!® 2.0, U.S. Atlas 4.0, World Atlas 4.0 and Chessmaster 4000. **\$59**

Sports Pack

Six action-packed sports applications. Includes Unnecessary Roughness '95™; Hardball 4™; FIFA International Soccer; PGA Tour® Golf; NHL® Hockey '95; and NASCAR® Racing. Also includes Gravis GamePad™ and CD holder. **\$99**

Kid's Backpack™

Seven exciting software applications specifically for kids with Sesame Street® Numbers; My First Incredible, Amazing Dictionary; The Cat Came Back; The Yukon Trail™; Keroppi Day Hopper; Math Blaster®. In Search of Spot; and Sing-Along Kids™. Also includes a 20-disc storage rack and microphone. **\$99**

Monitors

Gateway 17-Inch Vivitron™ Color Monitor

Non-interlaced color monitor using Sony® Trinitron® tube technology, capable of 1280 x 1024 resolution in non-interlaced mode, .26 dot pitch.

Upgrade from a 14-inch CrystalScan® 1024NI monitor **\$400**

Upgrade from a 15-inch CrystalScan monitor **\$320**

Upgrade from a 15-inch Vivitron monitor **\$275**

(Upgrade prices good only at the time of system purchase.)

Printers

Epson® Stylus™ Color Ink Jet Printer

Features 360dpi high-quality print resolution and 720dpi for more brilliant colors on specially coated paper. Exclusive technology produces a precise dot. Includes parallel cable. **\$559**

Hewlett-Packard DeskJet 540 Printer

Features clear, sharp 600 x 300dpi black printing on plain paper with a variety of built-in typefaces. Color option also available. Includes parallel cables.

\$299 (w/out color) **\$339** (w/ color)

New Epson ActionLaser 1400 Laser Printer

Features a high-performance RISC-based processor optimized to perform operations in fewer clock cycles than a standard CISC, as well as 600 x 600dpi with edge smoothing technology. Includes cables. **\$499**

Call for other printer options.

Gateway accepts most major credit cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers. You can also apply for the Gateway 2000 DuoLine™ MasterCard® card, issued by Dial National Bank, Des Moines, Iowa.



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WINDOWS 95


THE

We're all adults here. We've all upgraded our operating systems before. Remember Windows 3.0 to 3.1? Or DOS 3.3 to DOS 5? Forget 'em. Upgrading to Windows 95—due to finally touch down on retail store shelves later this month—is A BIG DEAL. A revamped interface, a new file system, 32 versus 16 bits, this upgrade journey is not to be embarked upon lightly, if at all.

So are you gonna take the plunge? Ultimately, it's up to you to make the call, depending on your hardware, software, expectations, and computing needs. But we can make some recommendations.

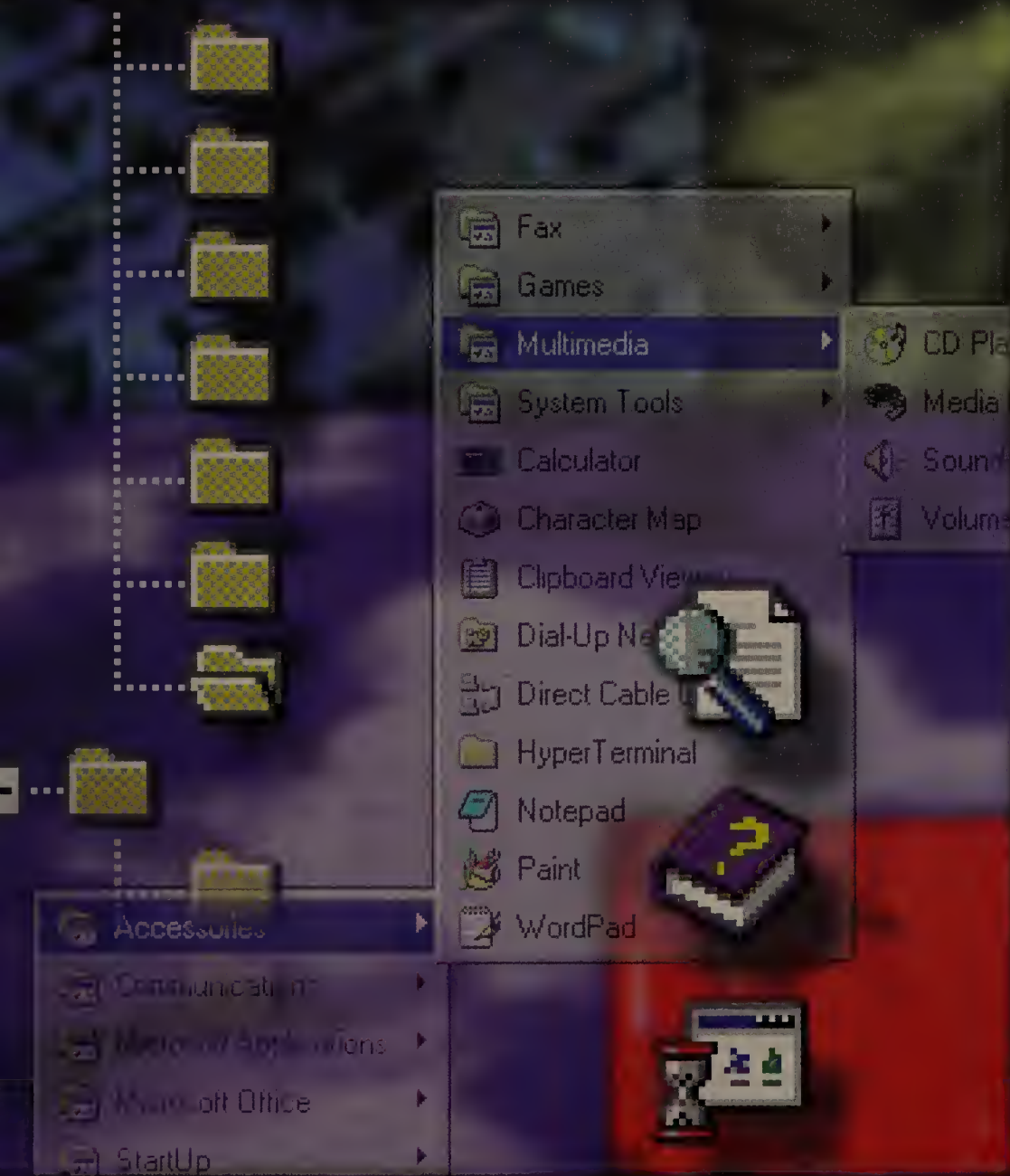
After all, many of us on the *PC World* staff have spent the last few months living with various prerelease copies (beta versions) of Windows 95, upgrading every time a revision came along. We ran our usual applications, interacted with our network, went online,

B Y S T E V E F O X

 **Start**



VERDICT IS IN



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installed new hardware and software, and did whatever we'd always done. By worshipping at the altar of Our Lady of the Perpetual Beta, committing our machines to Windows 95 months before it was prudent, we suspected we'd get gigabytes of anecdotal information to go along with our formal testing (see "Does Plug and Play Work?" "Notes From the Usability Lab," and "Is Windows 95 Faster?"). We were right. Here's what we found.

Make a Wish List

Your choice of operating system affects all your computing tasks (and probably says something about your personality, too). So to paraphrase that old shrinkmeister Freud, What do users want? In a word, productivity. We'd all like to get things done faster and with less effort. For those of us accustomed to the capriciousness of Windows 3.x, then, the Windows 95 wish list of features would start with stability, compatibility with existing applications, and greater system resources to run those applications. Pencil in reliable preemptive multitasking (concurrent operations, like

downloading a file, formatting a floppy, and writing a memo) and a more navigable interface. Add easier hardware installation, comprehensible networking for effective collaboration, and long file names for easier identification of documents. And, of course, don't forget faster performance and an installation program that works out of the box.

If Windows 95 could guarantee those ba-

on-ramp to the information superhighway (see "35 Top Features").

The biggest changes, however, may be those you can't see. Windows 95 is a 32-bit operating system...mostly. You see, Microsoft made some compromises—there's still some 16-bit code floating around, available for any existing hardware and software that require it. While that's good for compatibili-

By worshipping at the altar of Our Lady of the Perpetual Beta, committing our machines to Windows 95 months before it was prudent, we got **gigabytes** of anecdotal information.

sics, a huge percentage of Windows 3.1 users would upgrade overnight. That's a big if, however. And Microsoft doesn't like to take chances. So to induce stragglers to get with the program, Windows 95 sports a boatload of extra features. A few of the more noteworthy: a built-in online service (The Microsoft Network), a universal in-box for managing communications with the outside world (Microsoft Exchange), and a limited

ty with 16-bit applications, it means a sacrifice in terms of application performance and stability that you wouldn't otherwise make if Windows 95 were a pure 32-bit operating system. In fact, good old DOS isn't entirely banished from Windows 95, though it's well disguised. Turn on your PC and you'll boot directly in Windows.

Structurally, Windows 95 has fallen in step with OS/2's object-oriented approach. Fold-

Minimum Daily Requirements Hardware Essentials

Microsoft proudly proclaims that Windows 95 runs as fast as or faster than Windows 3.1 on the same hardware. In our testing of 16-bit applications running on beta of Windows 95 (see "Is Windows 95 Faster?"), we've found that contention to be true only if your PC has at least 16MB of RAM. With 8MB, applications ran noticeably slower. The shipping operating system might be faster, but it pays to make sure your hardware is up to snuff before you upgrade.

According to Microsoft, both Windows 3.1 and Windows 95 will run on a 386 with 4MB of RAM. They will, but if you've seen Word 6.0 for Windows run on such a system, you'll agree that you've

got better ways to spend your time. Microsoft's recommended system, a 33-MHz 486 with 8MB of RAM, is a far more realistic minimum. If the system you already own isn't this powerful, consider Windows 95 a good excuse to upgrade components or buy a new system.

Microsoft gives no recommendation for hard disk size. However, it has provided approximate disk space requirements for minimum, typical, and maximum installations (see the chart at right). Though Windows 95 itself can take as much as 65MB, it's worth noting that it doesn't need as much space for swap files as Windows 3.1 does. For one thing, the option to have a permanent swap file—which in the past could

permanently occupy 20MB or more—no longer exists. And if you have enough RAM (16MB or more), Windows 95 may never use your hard disk for virtual memory, depending on the number and type of apps you use. If you have only 4MB, expect Win 95 to use 15MB or so of disk space for swapping; if you have 8MB, then 8 to 10MB of swapping space is a safe estimate. Add roughly 7MB of swap file space if you plan to run Microsoft Exchange.

Shop for the Long Haul

If you're looking for a new system rather than installing Windows 95 on an old one, you need to choose hardware that will last three to five years. Here are a few general buying suggestions:

PROCESSOR. A 75-MHz Pentium is the place to start, with a 90-MHz or 100-MHz Pentium as the price/performance leader for the long haul. When Windows 95 offers software-based MPEG support at the end of the year, you'll need at least a 90-MHz Pentium to play MPEG videos full screen.

MEMORY. According to Microsoft, 32-bit Windows apps should demand 25 to 50 percent more memory than the current 16-bit variety. This, along with Windows 95's ability to run more applications at once with greater stability and speed, should encourage you to get at least 16MB of RAM.

MONITOR. If you're going to run more apps at once, consider a 17-inch monitor to have a comfortable amount of screen space

ers (what we once called directories), shortcuts (pointers you can double-click to get to an application, file, or folder), files, resources, you name it—they've now been designated as objects that you can move, manipulate, and inspect.

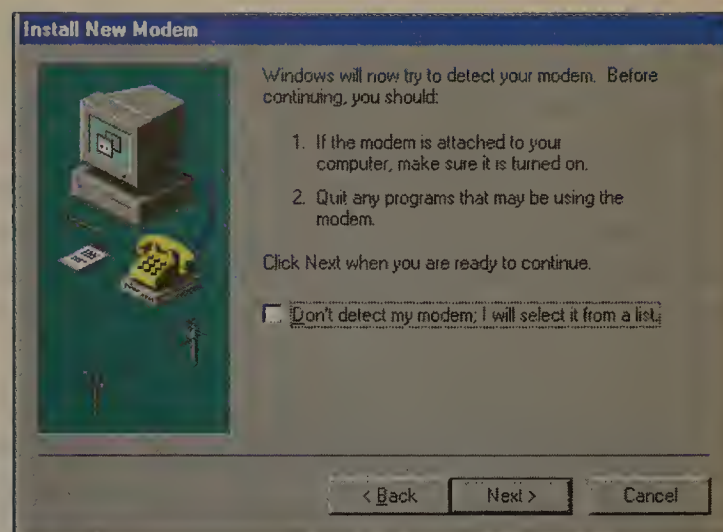
The State of the Beta

As of this writing, the software is still in beta, so our verdict is incomplete. We can confidently critique features (such as interface and utilities) and how they are implemented (drag and drop, folder views, and so on). These elements reportedly will not change between now and August. But because Microsoft's engineers are still working on performance and bug fixes, our appraisals in those areas are more tentative.

Using primarily 16-bit applications, we generally give a collective thumbs-up to the new interface, Plug and Play hardware configuration, overall stability, and system resource management, even as our more vocal OS/2 habitués decried Win 95's "shabby underpinnings." We also found that our older

software, by and large, worked and that performance on a variety of 486s and Pentiums with 16MB of RAM was comparable to Windows 3.1's.

The thumbs tended to point south in regard to installation, which evinced a few horror stories. And many of us were confused about the intricacies of navigating Microsoft Exchange. As for such 32-bit features as multitasking, multithreading (the ability to perform simultaneous operations within a single application), and long file names, we can't make any final pronouncements until more 32-bit applications ship. I was impressed by Windows 95's ability to format a floppy while downloading a file from The Microsoft Network; others found that running beta 32-bit applications was the easiest way to crash their system. Regarding long file names, it's easy to change a file name to 255 characters in the Explorer (File Manager's replacement). However, be warned: Your old apps will dis-



The Add New Hardware Wizard probes your system to get the lowdown on peripherals you're installing.

play only 8 characters and a 3-character extension. For now we'll keep our thumbs uncommitted...and our fingers crossed.

Lost in the Installation Morass

The good news: You'll probably be able to get Windows 95 to work on your machine. The bad news: You may run up a nasty phone bill talking to tech support. Roughly a quarter of our testers hit snags trying to install Windows 95. The biggest problems involved drivers, with a few CD-ROM drives that simply refused to install, even when we used the Add New Hardware Wizard. We also ran into snags getting our graphics boards to perform just right, forcing many of us to settle for chunky VGA resolution. As companies make updated video drivers available online and elsewhere, however, we expect that most display problems will be resolved.

Senior Associate Editor Lincoln Spector was one of the lucky ones. He found the upgrade "incredibly easy; everything worked the first time." On the other hand, Executive Editor Eric Bender's installation attempts proved "infuriating."

I've installed the operating system on four machines, and I'm batting .750. On machine four, an April 1995 beta rendered my 66-MHz Ambra DX2 inoperative for days. Though the technical support crew and I

and should be replaced; contact your system vendor to find out if your PC has a problem BIOS.

Remember, though, that Plug and Play BIOSes aren't essential for automatic configuration to work. They affect only boot devices, such as your hard disk interface. Still, in some cases, a Plug and Play BIOS can save you from installation headaches.

Ironically, one of the biggest sticking points in the Plug and Play scheme is the PCI bus. This bus was supposed to be "plug and play" with or without Win 95. Not so. To give Windows 95's Plug and Play its best chance of working with PCI, look for a system with a PCI bus built to the 2.1 specification. You may have to question your sales rep closely, or call the manufacturer, to determine your PCI device's pedigree.

—Eric Knorr



Disk Requirements

	Minimum install	Typical install	Maximum install
From scratch	30MB	35MB	65MB
Over Windows 3.1	23.5MB	27MB	48MB
Over Windows 3.11	18.5MB	22MB	43MB

in which to juggle them.

HARD DISK. 32-bit applications should demand 25 to 50 percent more disk space, not necessarily because the code is larger, but because every new app is invariably larger than its predecessor. Application inflation argues for 730MB to 810MB as a good hard disk starting size.

If you've held off getting an IDE drive larger than 528MB due to problems with 32-bit disk access, wait no more. Windows 95 provides 32-bit disk access to large

IDE drives without pain, though your system (or a special card) will need an Enhanced IDE BIOS to break the 528MB barrier.

Whether you're upgrading or buying new, having a system that fully supports Plug and Play will increase the likelihood that the machine will be able to configure expansion boards automatically. Nearly all new PCs have a Plug and Play BIOS, and many old ones can be upgraded. Be aware, however, that some early Plug and Play BIOSes are defective

were quickly on a first-name basis, we never did figure out what the problem was. Ultimately I had to reformat my hard drive (after backing up my data files) and start from scratch. In all fairness, that machine has responded superbly to subsequent betas, but the warning remains in effect: Windows 95 will present difficulties on

some machines. There's simply too much oddball hardware out there to guarantee everything will work.

If you want to set up your Windows machine as a Novell NetWare client, prepare to be pleasantly surprised: Windows 95's network installation routine is basically click and go, with all the right drivers loaded by

default and all the network drive mappings preserved from your previous setups.

One warning, however: In working with various beta versions of Windows 95, we found that if a user on a NetWare network elects to activate File and Print Sharing and then uses the Properties button to enable SAP Advertising, "nearby" workstations will

35 Top Features

Windows 3.1 it's not. Windows 95 is brimming with new features, from a redesigned interface to long file names. In case you'd like a refresher course, here's a quick rundown of the 35 most prominent additions.

1 Start button. Just what the name implies. Click it to launch applications, open files, get Help, find Find, and access Control Panel and other configuration tools.

2 The desktop. When you install Win 95, the desktop is a Felix Unger-esque treasure—a vast expanse punctuated by the occasional icon. But pick some aesthetically challenged wallpaper and drag in a few programs, documents, shortcuts, and printer icons, and you can make Oscar Madison proud in a hurry.

3 Taskbar. An ever-present strip that tucks itself along the bottom of the screen, it's Windows 95's Navigation Central. Click it to switch among open windows. The Start button, speaker volume control, and clock share the real estate as well.

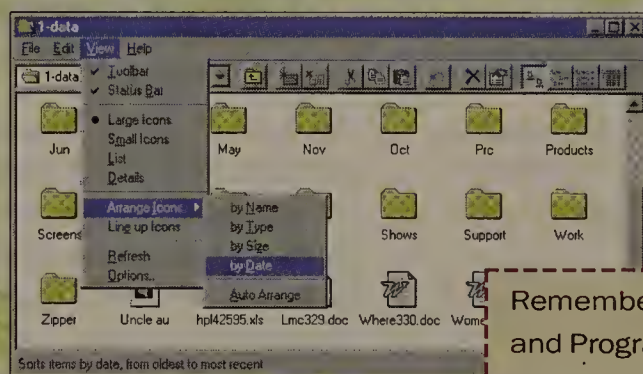
4 My Computer. Double-click this icon, nestled in the top left of your desktop, to burrow through successive levels of folders, files, applications, and utilities. But do yourself a favor first: Click its label once and assign it a new name. Have a nice day.

5 Explorer. File Manager in new duds, with a hierarchical view of drives, folders, and their contents. Out: directories, drive buttons, tiled windows. In: folders, clicking and typing to rename files, drag and drop.

6 Find. Conveniently located just four icons up the Start menu, it can locate files, folders, applications, other computers, and info on The Microsoft Network. It's fast and lets you store often-repeated search criteria.

7 Help. Accessible from the Start menu, it searches for words and phrases, in addition to topics. With its guided tours, tips, how-tos, troubleshooting advice, and 'Click here' buttons to step you through operations, it puts Windows 3.x's Help to shame.

8 Close, Minimize, Maximize. Ubiquitous buttons, located in the upper right corner of all windows, that behave as advertised and appear in the operating system as well as in any application that runs under Windows 95.



9 Plug and Play. Windows 95 can recognize and automatically configure Plug and Play hardware—sound cards, CD-ROM drives, and the like—with little user intervention. It also helps with older cards, but don't expect miracles.

10 Folders. Thanks a lot, Macintosh. These used to be directories and Program Manager groups. Now they're folders—icons that hold documents, apps, and other folders.

11 Long file names. An end to hieroglyphics. Now, augvacrq.doc can become a

comprehensible Vacation Request—August 95. Just keep it to 255 characters.

12 Microsoft Exchange. A universal in-box. Here's where you can send, receive, view, and manage E-mail from CompuServe, The Microsoft Network, and Microsoft Mail; Internet messages; faxes; and forms. A great idea, but you may need a road map.

13 The Microsoft Network. An online service from you-know-who that's tightly integrated into Windows 95. In fact, Windows 95's Find function can locate drivers, files, and forums there.

14 Drag and drop. Click and drag a folder into a folder; a document to your printer; a file name (accompanied by its full path) to the DOS prompt; or an application to the Start menu for subsequent one-click access. You get the idea. Definitely not a drag.

15 Scraps. Drag a selection from any OLE 2.0 application to your desktop to form a scrap. Later, drag the scrap back to copy it into another document.

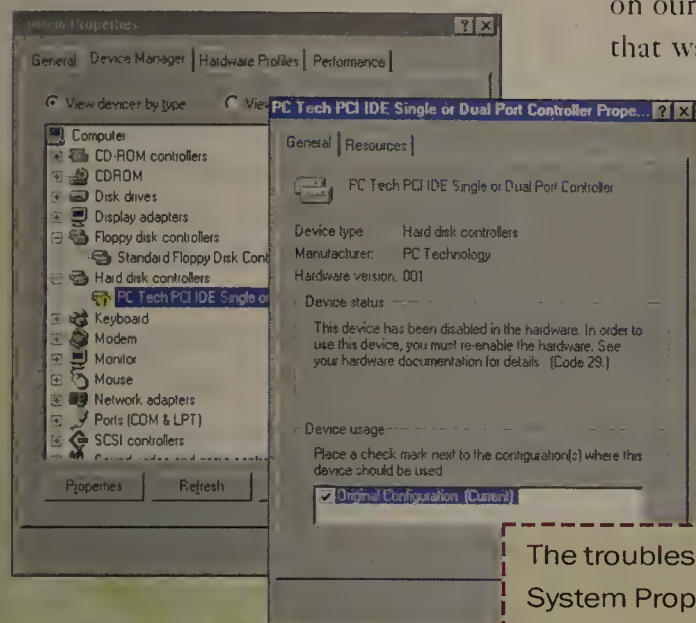
16 Shortcuts. Desktop icons that jump you to a document, folder, application, or resource with a double-click.

17 Right mouse button. The middle finger achieves respectability! Right-click an item to see a menu of common commands that apply to it. Or right-click and drag a folder or file and get a choice to move, copy, or create a shortcut.

18 Properties. Another option brought to you by the right mouse button. Properties lets you view or change information about doc-

Remember directories and Program Manager groups? Forget 'em. Now we've got folders, with icons to prove it.

attach to that Windows 95 user's system and will not be able to log on to the NetWare network. Furthermore, their attempts to log on will slow the network to a crawl.



The troubleshooter's best friend: The System Properties dialog box knows your PC's deepest, darkest secrets.

uments, folders, drives, printers, and so on. Check

Properties on your C: drive and get a pie chart displaying free and used space, or check out a file's size, attributes, and when it was created, modified, and last accessed.

19 System Properties. Deep within the bowels of Control Panel, here's where you can display, diagnose, and configure your system. You may find yourself digging around in here more than you'd fancy.

20 Registry. Central repository of all your hardware and software configurations. Perfect for propeller-head-style troubleshooting. Abandon all hope, ye who enter here.

21 Wizards. Series of dialog boxes that step you through complex procedures, like installing Windows 95, setting up a dial-in connection, or adding hardware. Very smart, if not exactly magical.

22 New utilities. WordPad is a vastly improved, 32-bit Write. HyperTerminal is a solid, 32-bit Terminal. Paint is a slightly more functional Paintbrush. Notepad is still, well, Notepad. You can't have everything.

23 Recycle Bin. Politically correct file disposal. Drag and drop and kiss your files good-bye. But, as with the Macintosh Trash Can, the files aren't gone for good until you empty the bin.

Hardware That Works

I sat in on a recent editorial department confab that was reminiscent of an old-fashioned revival meeting. We were comparing notes on our Plug and Play experiences, and all that was missing were cries of Hallelujah, Praise Ye, Gates. Performance Analyst Kirk Steers started it off.

24 Briefcase. Sounds oh-so-corporate, but it's actually an easy way to synchronize files between your office and home machines or your desktop and notebook PCs.

25 Network Neighborhood. A mouse-driven, graphical way to browse and connect to all the machines in your workgroup (assuming you have access privileges), plus servers in multiple networks. Could make your MIS department nervous.

26 Direct cable connection. Networking sans network. Hook up two computers via a serial or parallel cable. The client machine (generally a laptop) now has access to printers and any network resources the host computer calls its own.

27 Internet connectivity. Another benefit of Windows 95's dial-up networking. Microsoft provides TCP/IP and Winsock, the software you need to connect to the Internet. You provide the account (which will cost you) and any browsers you might want to use.

28 Peer-to-peer networking. Windows for Workgroups, 32-bit style. Setup is more helpful, and sharing folders or printers is more mouse-worthy. Plus there's Microsoft Mail in the box. But where's Schedule+, a Windows for Workgroups staple?

29 Autoplay. Pop an audio CD into your CD-ROM drive, and the tunes start right up. You can also automatically launch applications on Autoplay-ready CD-ROMs (including Setup from the Windows 95 installation disc).

"I installed a network card under Windows 95 this morning. I slapped it in, and shazam—it worked immediately." I then testified about my recent 5-minute installation of a sound card and CD-ROM drive. The testimonials continued, with Senior Technical Editor Karl Koessel applauding the way Windows 95 had configured a PCI SCSI

30 Tab dialogs. Not a diet cola rap session. It's actually a collection of labels, like tabs on a file folder, that let you switch among related options within a single dialog box. In Display Properties, for instance, the four tabs are Background (for wallpaper), Screen Saver, Appearance (for color scheme), and Settings (for resolution and color depth).

31 Crash protection. The Holy Grail. Windows 95 is much better than its predecessor, but it's not bulletproof. If Windows 3.1 is a T-shirt, and NT an armored car, then Windows 95 is a flak jacket.

32 Preemptive multitasking. The computer equivalent of walking and chewing gum at the same time. Windows 3.x walks, then chews gum, then walks again. Running 32-bit apps, Windows 95 manages to keep both jaw and feet moving.

33 Quick View. Right-click a file, and if Windows 95 is familiar with the format, you can view it without opening the application. It's not as smart as it could be, and it won't let you print or even copy, but it beats twiddling your thumbs while Excel launches.

34 Resolution switching. Right-click the desktop, choose Properties • Settings, and change from, say, VGA to 800 by 600 resolution without rebooting. If your graphics setup can handle it, you can also switch color depth all the way up to 16.8 million colors. But changing color depth demands a restart.

35 A better DOS. Command-line commandos will think they've stumbled onto DOS 7.0. The greatest-hits list: the new Start command, workable copy and paste, improved performance of apps in a DOS window, and automatic scaling of TrueType fonts. —S. F.

host adapter and the previously unrecognized CD-ROM drive connected to it.

We're convinced. Plug and Play—a spec that allows users to easily install and configure hardware in a Windows 95 system—is for real. Install PnP peripherals and you'll have few headaches. Stray from the straight and narrow, though, by mixing PnP with non-PnP devices, and things could get sticky (see “Does Plug and Play Work?”).

Reboot, Be Gone

Overall stability and vastly improved resource management are the main reasons

I've already upgraded my PC to Windows 95. Windows for Workgroups running 16-bit applications used to crash my system a few times a week. No more. I haven't rebooted in ten days, although individual 16-bit applications, including America Online and Word 6.0 for Windows, have mysteriously conked out on rare occasions. In Windows 95, <Ctrl>-<Alt>-<Delete> brings up the Close Program dialog box, where I can choose End Task or, for a full reboot, Shut Down. So far, End Task has worked wonderfully, shutting down the offending application and letting me get back to work.

Ironically, it's a 32-bit application, The Microsoft Network, that has occasionally forced me to reboot my system. The 32-bit NT versions of Word for Windows and Excel that I'm running, however, seem well behaved, if sluggish.

Associate Editor Michael Desmond has been trying to crash Windows 95 for weeks now, with only limited success. “I go entire weeks without a crash, though I've managed to bludgeon it into submission once or twice over the past three weeks, forcing 16-bit Excel to freeze and bringing down the whole OS at least once,” he said.

What's Missing?

What doesn't Windows 95 have? Plenty. Here are just a few of the standard DOS, Windows 3.1, Windows NT, and OS/2 features that Windows 95 simply lacks.

Out With the Old...

KEYBOARD NAVIGATION If your fingers like staying at the keyboard, they're going to hate Windows 95. Try navigating around the icons on your desktop using only the keyboard. No problem—once you've clicked one of them with the mouse. And with Windows 3.1's File Manager, if you wanted to copy a file to a directory that wasn't on screen at the moment, you could press <F8>, type your desired destination, and press <Enter>. Nothing that straightforward in Windows 95, where if you can't see a directory, you can't copy to it.

TOGGLE TO THE DESKTOP Want to click an icon on your desktop? Easy, isn't it. Sure, unless you've got ten applications running full screen. Then you'll have to iconize ten applications, one click at a time, before you can even see the desktop.

VIRUS PROTECTION Key fea-

tures in 16-bit antivirus programs won't work in Win-

dows 95; 16-bit viruses will. Unfortunately, because unlike recent versions of DOS, Windows 95 has no antivirus program of its own.

RETRIEVING DELETED FILES

There's no traditional undelete, just a Recycle Bin—a temporarily safe place where files go when you delete them. But empty the trash and you're up a creek. Unformat's missing, too.

SCHEDULE+ Sorry, but Microsoft has decreed that from now on, the calendar, a Windows for Workgroups staple, belongs in Office, not Windows. Even worse, your existing 16-bit version of Schedule+ will work only as a

stand-alone product for keeping track of your personal calendar and tasks. So much for group scheduling.

AUTOMATION Between DOS and Windows, you've got three ways to automate routine tasks. DOS has its batch file and QBasic, and Windows has Recorder. None of them are great, but at least they're there. In Windows 95, two of them aren't. There's

no BASIC to write code in, and no Recorder to automate your keystrokes and mouse clicks.

And Out With the New

If Windows 3.x users are going to miss a few old features, those who know OS/2 and Windows NT will feel downright deprived.

IMPROVED FILE SYSTEM Windows 95 has tweaked the aging FAT system, giving you long file names and performance gains. But unlike working with OS/2 or NT, you're still wasting space and time with giant clusters and a file allocation table that was built for floppies.

APPLICATION PROTECTION Both OS/2 and NT can, in a sense, build a wall around a

Windows 3.x application, protecting other applications from its antisocial behavior.

But Windows 95 puts all its old-style Windows programs in the same memory space, where they can trip each other up and come crashing down together.

SECURITY Windows NT is the operating system for the para-

noid. Even if you're not on a network, you can password-protect your hard drive. Windows 95? Anyone who sits at your computer can see what's on it.

MULTIPLE ASSOCIATIONS OS/2 lets you associate a file type with more than one program—handy if, say, you want to bring up a bit map sometimes in Paintbrush and other times in Photoshop. With Windows 95, it's one association per file type.

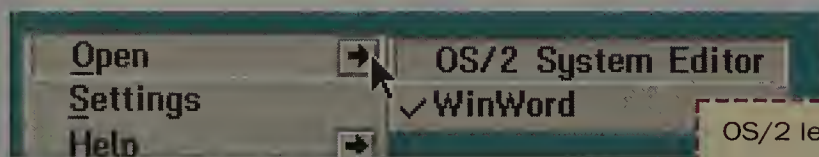
GROUP LAUNCHING Windows 95 lacks OS/2's work area folders, which let you treat multiple documents or apps as a single unit, launching, closing, or minimizing them as a group.

ADVANCED VIDEO Windows 95 won't improve video frame rates on inexpensive hardware.

Microsoft pulled support for Intel's DCI standard, promising its own alternative, DirectDraw. But DirectDraw won't ship with the release version of Windows 95, leaving graphics board vendors scrambling to write DirectDraw drivers for their DCI boards.

—Lincoln Spector

Scott Dunn, Lou Miranda, and Scott Spanbauer contributed to this sidebar.



OS/2 lets you associate a file with more than one application. Not so with Windows 95.

Many of us have been particularly impressed by Windows 95's dexterity with cc:Mail 2.0 for Windows, one of our primary productivity apps. Under Windows 3.1, cc:Mail crashes were frequent and virulent, necessitating an immediate reboot. These days, cc:Mail still crashes—a dialog box announces that the application has performed an illegal operation—but escape is now painless: Exit cc:Mail, re-launch (without restarting Windows), and you're all set.

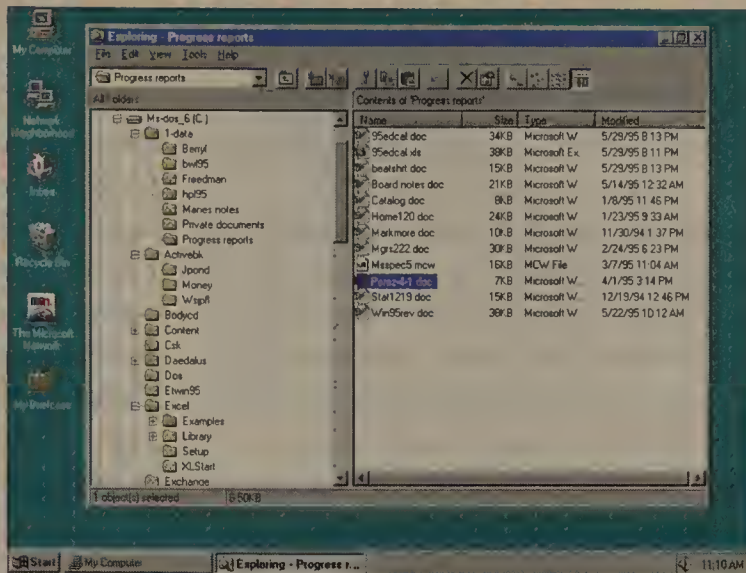
Once-rampant resource problems have ceased to haunt many of us as well. Under Windows 3.1, whenever I ran more than four applications, I risked draining my "System Resources," which is measured in "percent free" from Program Manager's Help menu. Below 20 percent, my PC would simply stop working. For testing purposes only, as I write this I'm running an Olympic record number of applications: cc:Mail Remote, Excel 5.0, Word 6.0 for Windows with four files loaded, a DOS box, three instances of Paint, the CD Player utility, System Monitor, WordPad, Notepad, Visioneer PaperPort, plus the games Minesweeper, Solitaire, and FreeCell. According to Control Panel, I have 48 percent of my system resources free. When I add a second instance of WordPad and, just for nostalgia's sake, load Windows 3.1's File Manager and Program Manager within Windows 95's desktop, I drop down to 40 percent. And keep right on computing.

Others among us report similar experiences. Desmond's juggling act, for instance, includes Access 2.0, Excel 5.0, WinWord 6.0, cc:Mail for Windows, and assorted online services, not to mention the odd DOS box, PageMaker, and CorelDraw.

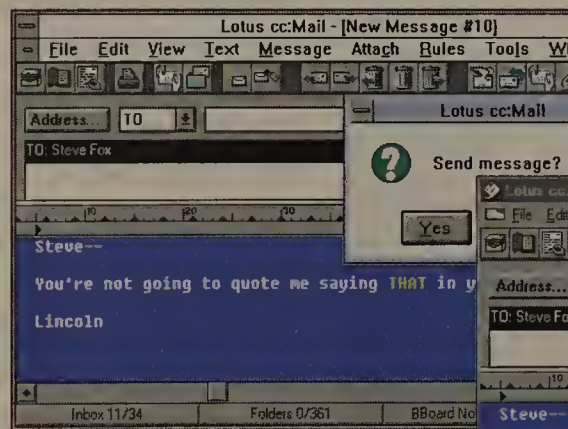
Interface in Your Face

"Windows 95's look, feel, and behavior is far superior to that of Windows 3.1," says Editor in Chief Phil Lemmons, summing up the sentiments of the Windows 3.1 users on staff. In Windows 95 you can launch applications the same place you delete, move, and otherwise manipulate files and folders—

not exactly a radical concept (look at the Mac and OS/2), but a welcome one after Windows 3.1's wrongheaded insistence on separating program and file management. The Start menu is much easier to navigate than the messy mélange of Windows 3.x's Program Manager groups, and the taskbar is great for switching among applications.



To drag a file from a folder to a drive, you must first scroll until both the file and the drive are visible.



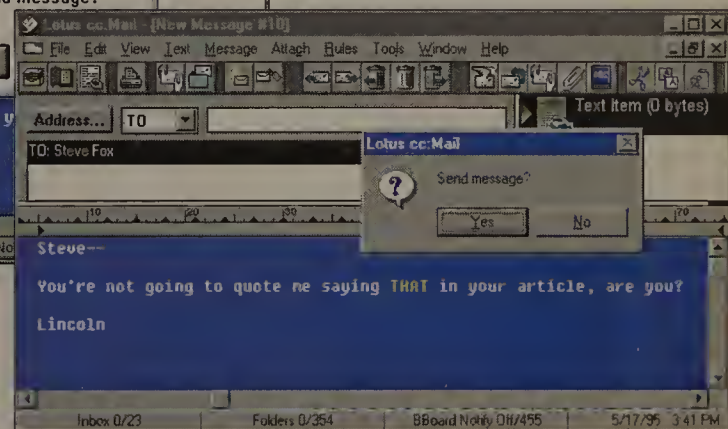
BEFORE: 16-bit cc:Mail running under Windows 3.1.

High marks also go to integrated help, the Find function, and views within windows that consistently show either large icons, small icons, a list, or a list with full details. But the reviews aren't entirely positive. The "brain-dead" Explorer, for example, has its detractors. Explorer, which replaces File Manager, presents a clean, two-pane view, with folders on the left and the folder's contents on the right. To drag a file from a folder to network drive H:, however, you must make sure both folder and drive H: are visible in the left pane. You can always click the folder, exposing the desired file in the right pane, scroll down with the slider bar to re-

veal H:, then drag the file there—a tedious procedure. In File Manager, you could simply drag the file to the H: drive icon. Another common complaint: Files don't reorder themselves automatically. Create a new file and it goes to the bottom until you re-sort. This is progress?

Shortcuts—icons you can double-click to jump to folders, applications, files, and so on—had many of us scratching our heads. A decent enough idea, we agreed, but implemented so inconsistently as to render them only marginally useful. What's the problem? Dragging an executable file between folders automatically creates a shortcut to the program, leaving the executable in the original folder. But drag a data file to the desktop, and Windows 95 *moves* it, placing it in a directory called Desktop. Try the same maneuver with an entire drive, and Windows 95 informs you that you can't move or copy the drive to the desktop and asks, "Do you want to create a shortcut to the item instead?" The right-drag is a bit more clever, offering a choice of moving, copying, creating a shortcut, or canceling the operation. But with so many possible mouse-drag operations, users will often have no

idea if they've moved, copied, or simply created a shortcut to a file. Equally vexing, shortcuts work only until you move the file to which they refer. Then all bets are off. As Contributing Editor and Windows 95 enthusiast Scott Spanbauer puts it, "Shortcuts are a Win 95 feature I just don't get yet."



AFTER: The identical application under Win 95. Even the dialog box and menu text have a new look.

idea if they've moved, copied, or simply created a shortcut to a file. Equally vexing, shortcuts work only until you move the file to which they refer. Then all bets are off. As Contributing Editor and Windows 95 enthusiast Scott Spanbauer puts it, "Shortcuts are a Win 95 feature I just don't get yet."

Will My Software Run?

When 32-bit applications built for Windows 95 become available, we'll all be mighty tempted to check them out. For a while,

though, Windows 3.x-style apps will continue to populate our hard drives.

Fortunately, Windows 95 handles most conventional 16-bit applications without a hitch, and gives them a quick cosmetic makeover to boot. As an example, check out the cc:Mail screens on the previous page. Under Windows 95, standard 16-bit applications gain the new minimize, maximize, and close buttons at the top right while getting that beveled icon look. The application name moves from the center to the left side

of the title bar, and what had been the control box, flush left on the title bar, becomes an application-specific icon (though it provides the same functions). New 32-bit apps will adopt even more of the Windows 95 look, with proportional slider bars (large sliders indicate most of the window is already on screen; a small slider means there's lots of information not visible until you scroll to it), plus common dialog boxes for file operations like new, open, and save.

Good looks aside, to date only two non-

networked 16-bit applications I've found—Adobe Illustrator 4.0 for Windows and Tropical Publishing's 999+ TrueType Fonts for Windows—won't launch under Windows 95. And my Type 1 Adobe fonts seem to disappear from my applications font list whenever I try to print to WinFax Pro.

Editor in Chief Lemmons and his four-year-old son, Matthew, report that even picky DOS educational titles like Putt-Putt Joins the Parade and Jump Start Kindergarten are a breeze under Windows

Report From a Network Administrator

You may be excited about Windows 95, but what do the folks who run your network think about it? Probably something like this: "Just when I've got my client situation under control—drivers are coexisting peacefully, applications are stable—along comes a new version of Windows to screw up the works."

heard this sort of thing before. How does Windows 95 look to this grizzled former administrator? Like a fresh coat of paint on a worn-out jalopy. There's simply very little that's "new and improved" here.

Yes, the product ships with a 32-bit NetWare requester and TCP/IP support, but otherwise it's nothing more than Windows for

Workgroups on steroids. For example, like Windows for Workgroups, Windows 95 is still plagued by a reliance on—and a nagging sensitivity to—the real world of the real mode. Load the wrong driver combo in config.sys and autoexec.bat, and you can undermine Windows 95's 32-bit file system. There goes long file name support. Yech!

Won't virtual device drivers (VxDs) alleviate this problem? Yeah, if

back in the real-mode quagmire. And VxDs themselves give most IS veterans the shivers, since they can go

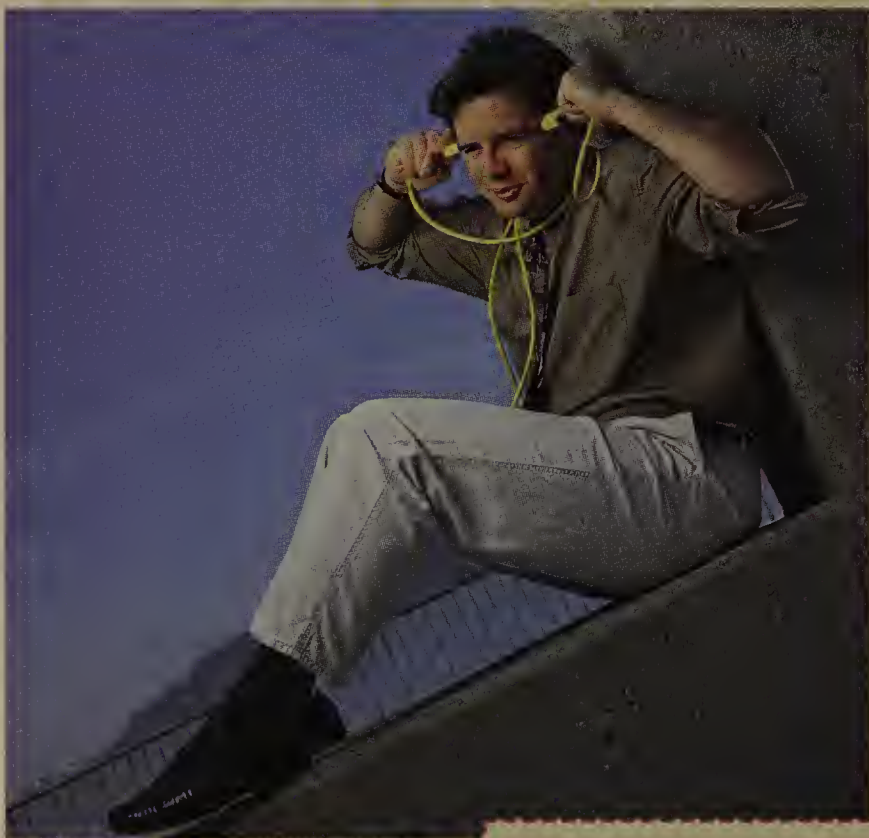
anywhere and do anything in the system. VxDs run in a special part of the Intel CPU called Ring 0; regular apps are not allowed there for a good reason: There's little to restrict what ill-behaved code can do in Ring 0. The idea of all those Ring 0 superdrivers floating around doesn't instill peace of mind in the average IS manager. With real-mode drivers, at least we could debug a configuration at the DOS level. With VxDs, it's a brave new world of protected-mode headaches.

Speaking of headaches, the Network Neighborhood, which lets users "effortlessly browse" network resources, signals it's time for a security audit. Just what every IS manager needs—users poking around in places where they simply should not be.

To help you manage your networks, Windows 95 is tightly integrated into Microsoft's proprietary Systems Management Server. But if you've already found third-party solutions that you're happy with, SMS will just be one more annoyance. In fact, much of what's in Windows 95 can be replicated now with Windows for Workgroups—it's just been repackaged, and in some cases, bundled with the base product.

To its credit, Microsoft has done a good job of making Windows 95 a friendlier starter network for peer-to-peer situations. But in terms of corporate desktop functionality—especially in light of Microsoft's more robust offering, Windows NT—I defer to what Lloyd Bentsen would have said: "I knew Windows NT; Windows NT was an operating system of mine. Windows 95, you're no Windows NT!"

—Randall C. Kennedy



Randall C. Kennedy is president and CEO of Competitive Analysis, an Albany, California, research and consulting firm.

Not that most IS professionals aren't intrigued by Windows 95. Microsoft is promising easier setup and configuration, relief from the torture of juggling DOS device drivers and TSRs, and, of course, reduced training costs thanks to the slick new user interface. Well, that's nice, but we've

they're available. Right now Windows 95 has drivers for a finite number of peripherals. Throw in an oddball item like an ISDN card or other nonstandard adapter, and you're right

95, whether they run in a DOS box or full screen. Lemmons foresees plenty of teeth gnashing, however, when a full-screen DOS application launches, hiding the taskbar. How will mouse-happy users who don't know the keystroke combos (<Ctrl>-<Esc> or <Alt>-<Tab>) get back to Windows?

For many standard utilities, all bets are off. For instance, 16-bit backup programs like Norton Backup will be flummoxed by long file names and could actually overwrite long names with short ones. Ditto for Stack-er 4.0, which can destroy long file names during compression. And add Windows 3.1-style memory managers to the list of utilities that won't work out of the box on Windows 95; you'll probably have to dig around in your config.sys if you want to get them running. Expect problems also with 16-bit virus protection, old Windows 3.1 shells like Norton Desktop and PC Tools, and defraggers. Win 95 supplies its own 32-bit backup, defragmenter, and compression utilities, but these programs are strictly bare bones. Full 32-bit versions from third parties should help.

For networked applications, check with your vendor to make sure your application will still work. You won't be able to use your old Schedule+ 1.1 from Windows for Workgroups for group scheduling, for instance, only as a stand-alone package. (For licensed Windows for Workgroupies who upgrade, Microsoft promises a free upgrade to a 32-bit version of Schedule+, available around the time Windows 95 ships.)

Connections Are Everything

Great communicators will likely appreciate the stability Windows 95 affords to communications apps. Contributing Editor Spanbauer, for instance, notes that "WinFax Pro, cc:Mail Mobile, Procomm Plus, Trumpet Winsock, AOL, and WinCIM all run without a hitch, usually at 28.8 kbps."

Spanbauer also reported little difficulty getting his Internet connection configured, though Windows 95 provides only the barest-bones software—TCP/IP and Winsock—to facilitate connection. To actually surf the Net, the user must have an account with an Internet provider plus a browser like Netscape or other tools for getting around. Where will Internet users get bogged down? "Resolving conflicts between the version of Winsock that comes with

Report From a Gamer

Forget everything else you read about Windows 95. What *really* counts is how it plays games. How it flies, shoots, scores, and sounds. So I tossed a dozen popular games—mostly DOS based—at a beta version of Windows 95. Okay, there's a serious side to this frivolity. Nothing stresses a machine more than multimedia entertainment, and nothing tests an operating system's compatibility like a DOS game. If Windows 95 can handle games, it should be able to handle anything.

Windows 95 does do games. In fact, it does them so well that I started tossing out the custom-made boot floppies I relied on when I ran DOS games in DOS. Games that would launch only from a DOS window in Windows 3.1 ran right from the Windows 95 desktop, and games that wouldn't run at all under Windows 3.1 did just fine. Most of the DOS games dropped automatically into Windows 95's single-tasking DOS mode, which first shuts down all other programs. Not ideal, but it beats the old method of exiting Windows, rebooting with a floppy, and launching a game from the DOS prompt. Bottom line: Installing and playing games is simpler and slicker in Windows 95. But let's get to specifics.

FLIGHT SIMULATOR 5.1 This DOS classic, once considered the benchmark for PC compatibility, installed without a hitch and guessed the sound setup properly. It launched effortlessly, then flew fine—much better than under Windows 3.1.

DOOM II Good news for the blood-and-guts crowd: Doom lives—and you die—in Windows 95. The Add Program Wizard gets Doom onto the hard disk from the CD-ROM—like all DOS programs, without an icon—in minutes. Best of all, Doom's speed—a critical part of its charm—stayed high.

LINKS 386 Installation went weird, complete with an 'Unexpected Error' message. After rebooting, I tried launching Links by double-clicking the GOLFCDD icon within its

folder, only to crash the game within moments. All that worked was opening a DOS window and starting the game from the prompt. Links was the only DOS game I tried that wouldn't drop into Windows 95's MS-DOS mode automatically.

SIMCITY 2000 COLLECTION A Windows game, it installed fine, but I had to manually reactivate the sound whenever I maximized the application from the taskbar. Even worse, SimCity 2000 drains Windows 95 something fierce. While it was active but still minimized to the taskbar, everything slo-o-o-owed down.

Gregg Keizer is a games aficionado based in Eugene, Oregon.



A downgrade, not an upgrade.

As games designed for Windows 95 surface, expect even more fun. I got my hands on a beta of 500 Nations, a Microsoft multimedia title, and saw a noticeable improvement in video-audio synchronization, probably due to the 32-bit file access and built-in support for quad-speed CD-ROM drives. Other goodies to look for include full-screen video, thanks to support for the Cinepak and Indeo video compression schemes; AutoPlay, which recognizes and runs a CD as soon as you slip it in the drive; and best of all, fast animation. I've seen betas of video games that make characters like Sonic the Hedgehog blaze through Windows 95. And that's enough for a fun-lovin' guy like me.

—Gregg Keizer

Windows 95 and the one that comes with their suite of net applications (like Chameleon) could be tricky," Spanbauer admits. "You'll have to rename one or the other, or make sure the one you want to use appears first in the search path."

And if you don't want to sweat finding a Net provider and adding software, Windows 95 offers The Microsoft Network, a built-in

online service that promises limited Net access sometime later this year. Our testers saw the potential in the service but were put off by its still-limited content. And since online fees were not yet determined at the time of this writing, it's hard to know if MSN will be worth the price of admission.

My biggest complaint: Microsoft may have done too good a job integrating MSN

into Windows 95. The boundary between online service and operating system is fuzzy, which may prove confusing if you're accustomed to thinking in terms of separate applications. For instance, when you're online, double-clicking a document icon opens WordPad to display the document. If you're logged in and have an E-mail message, an MSN dialog box informs you and asks if you

want to 'start mail now'. Answer yes, and your Microsoft Exchange Inbox, which sits on your desktop even when MSN is inactive, pops to life, sucking in the message. Want to navigate the byways of MSN? You won't find the search function in MSN itself. You'll have to click Find on Windows 95's Start menu to search for files or folders on your PC; other computers on your network (if you have one); or folders, forums, file libraries, Internet newsgroups, and the like on MSN. Integrated? Yep. Confusing? You betcha.

What's more, you may not realize you haven't logged off. I've closed WordPad documents, for instance, thinking I had signed off, only to discover I was still connected. In fact, I hadn't exited from the service's opening screen. My only clue was the tiny blinking lights on the modem icon at the bottom right of the taskbar. I expect the MSN billing department will hear its share of complaints.

More muddled is Microsoft Exchange, a great idea that gets bogged down in the execution. Exchange is the message center, a place where you can sneer at the term *information overload*. An icon on your desktop, it's a universal in-box and out-box for sending and receiving faxes by way of the built-in Microsoft Fax program or electronic mail from CompuServe and The Microsoft Network. It's also an upgrade to Windows for Workgroups' Microsoft Mail product, so you can create a Mail Post

Report From an OS/2 Devotee

Since version 2.0 came out in 1992, I've been using OS/2, and after investigating the competition, I'm not switching. Windows 95 is better than Windows 3.1, but it doesn't hold a candle to what IBM offers.

Windows 95's installation was not easier than Warp's, but it did show off the system's best attribute: It's beautiful! Win 95 is also easier to learn than

and you use the right mouse button to manipulate it.

Warp's right-button pop-up menus give you *all* the options available for an object; in Windows 95 the menus give you *some* options, and the options don't always make sense. For example, why are Properties on the right-button menu, but Options only in the View menu?

A telling contrast: Properties

In Warp, a folder looks like I want it to look.

Windows 95 has no scripting language beyond antediluvian DOS batch files. Warp has the object-oriented, cross-platform, cross-application ObjectREXX. Warp also lets me turn folders into work areas. Minimize or close such a folder, and Warp minimizes or closes any running applications inside it. Reopen it

colors, bit maps, or menus for individual folders.

Lou Miranda is an OS/2 programming consultant based in St. Paul, Minnesota.

and the apps restart. No such capability exists in Windows 95.

Also lacking: real access to cyberspace. Warp has everything from a Web browser to a CompuServe front end. Windows 95 has TCP/IP, a CompuServe Mail front end, and access to Microsoft's online service. If you want more, you'll have to go elsewhere. But then, Warp comes with a lot of free stuff not found in Windows 95, including a contact manager and spreadsheet.

Windows 95 can promise the sun, the moon, and the stars, but it falls short compared to the 32-bit DOS- and Windows-compatible operating system I've been using for three years. Moving to Windows 95 would be like moving back in time.

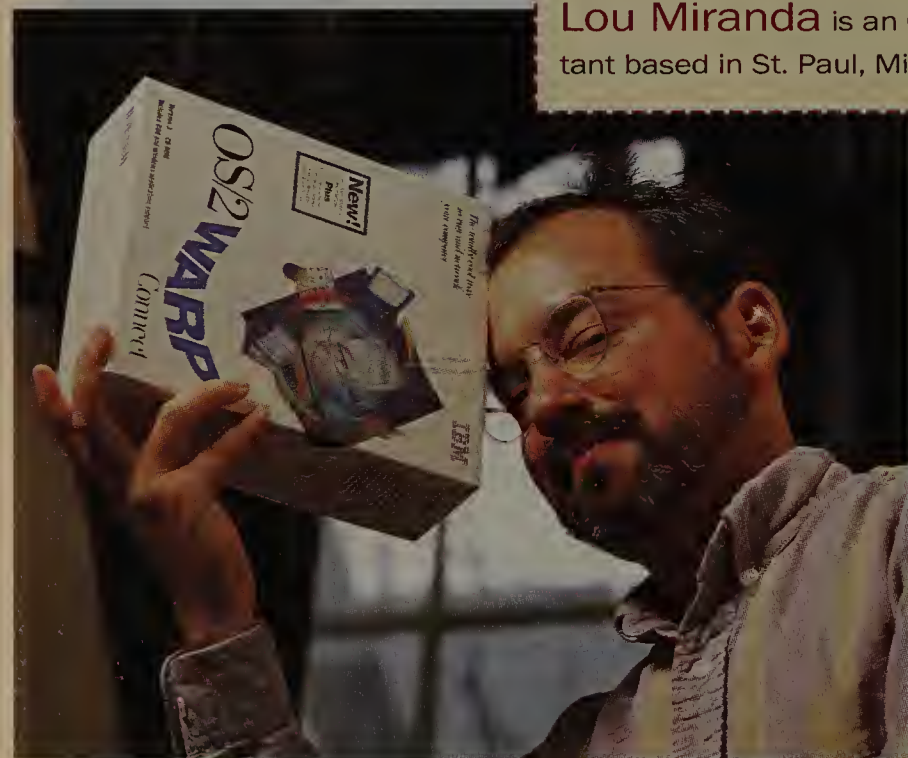
—Lou Miranda

Warp; things can't get much simpler than a Start button.

Now if Microsoft could just do something about consistency; it seems as if Windows 95 were designed by committee. In contrast, Warp has one underlying theme: Everything is an object,

from an OS/2 folder's pop-up menu yields a dialog box with eight tabbed pages of options. Windows 95 gives one tabbed page. (Why have a tab at all?)

What about distinguishing one folder from another? In Windows 95 I can't customize fonts,



Office or hook up to an existing one, sending and receiving messages and schedule requests. Unfortunately, Exchange's interface is confusing as all get-out.

Users must set up profiles, distinguish and navigate among a variety of mailing list types, and do more tinkering and manipulating than your average chiropractor. I suspect I still have a piece of E-mail tucked in my out-box, waiting for me to figure out exactly what I must do to get it sent. And what if you get messages from America Online, Prodigy, cc:Mail, and mail systems other than Microsoft Mail—or a fax program that's not Microsoft Fax? Those messages won't come into your Exchange in-box at all. You'll still be checking multiple in-boxes. Third parties can rewrite their apps to take advantage of Exchange (Lotus's cc:Mail, Delrina's WinFax Pro, and others will add Exchange support at some point), but users

Microsoft Exchange's interface is **confusing** as all get-out.

Unsuspecting users will probably have to do more tinkering and manipulating than your **average chiropractor**.

may not be swayed. Trading in the rich look, feel, and functionality of, say, WinFax Pro for the sparse terrain of Microsoft Fax doesn't sound like much of an upgrade, even if a single in-box adds convenience. Back to the drawing board on Exchange.

Timing Is Everything

So should you make the switch? Warp users will be unswayed by Windows 95's charms, but if you're a Windows 3.x user today, the answer is an emphatic yes. In fact, although the Windows types on staff had individual criticisms, all agreed they would upgrade their own machines. Many of us, in fact, have already switched our machines over, even though the software is still in beta. "I removed Windows 3.1 from my main system in February," says Spanbauer. "I don't even have an old version of DOS on my computer." Editor in Chief Lemmons, too, has made the leap. "It's simply a better user interface," he explains.

The question, then, shifts from "Should I?" to "When?" Our more prudent beta testers suggest waiting until well after Win-

dows 95 ships. Contributing Editor Steve Bass advises sticking with Windows 3.1 "until Microsoft releases Win 95.1, or whatever they call the upgrade/maintenance release." Spector recommends you wait 90 days. "Then consider the horror stories that will be circulating, the inevitable bug fix, and the utilities that are available. Utilities are key, because many of your old utilities—backup, virus protection, memory managers, and Windows shells—will be obsolete. Make your decision then."

Good advice for an office environment. But on a home machine, where you're looking to have some fun, you can afford to be less cautious. You probably don't have mis-

sion-critical information there, and the minutes you lose while troubleshooting possible installation problems won't endanger your job. Besides, you may be running some games, CD-ROMs, online services, and maybe even some old DOS stuff, and Windows 95 is simply a more stable, more aesthetically pleasing platform for 16-bit applications. My recommendation: Back up your system and immediately plunk down \$110 for the Windows 95 upgrade (or \$210 for a full version). Then keep your eyes open for any 32-bit utilities you need. They'll start hitting the stores and online services shortly after Windows 95 ships.

For a networked environment, greater conservatism is in order. Win 95 has behaved well running

Where to Buy

Microsoft Windows 95

Street price: \$209.95, upgrade \$109.95; 800/426-9400 Reader service no. 769



under *PC World's* NetWare network, but other shared apps could cause fits, especially if not everyone upgrades. For instance, when you upgrade from Windows for Workgroups, you'll have to recreate any shared directories. If you're using Schedule+ in your office, you'll

have to wait for the new 32-bit version. Ditto for offices that make

use of meeting software, network-based backup programs, and the like. Not all networked 16-bit group apps will run under Win 95; check with your vendors first.

Long file names, too, may prove troublesome if some users are running Windows 3.x or DOS while others use Windows 95. The file "Preliminary Report--Do Not Distribute" will look like prelimi~.doc to your 16-bit brethren. If you're working in a group, don't upgrade until the whole crew is ready to join you.

For forward-thinking companies, that day may come pretty soon. "Let's remember," says Executive Editor Eric Bender, "Windows 95's real competition is the previous versions of Windows. Windows 95 ain't perfect, but it's better at just about everything than Windows for Workgroups was."

Steve Fox is an executive editor, Lincoln Spector is a senior associate editor, and Scott Dunn, Eric Knorr, and Scott Spanbauer are contributing editors for PC World.

Coming Up in PC World

This issue begins our extended coverage of Windows 95. In September—once we've had an opportunity to appraise the shipping version of the operating system—we'll publish complete performance test results. Plus, we'll offer tips for installing and using Windows 95; a strategic look at businesses preparing to upgrade; and an Instant Reference Card pullout to help you navigate the interface.

In October we'll preview the leading applications for Windows 95 (followed in ensuing months by full reviews of shipping versions of those products), and we'll dig even deeper into Windows 95 with Part II of our Instant Reference Card.

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Does Plug and Play Work?

Plug and Play promises to make installing add-in cards easier than ever. Our tests reveal how well the promise has been kept.

BY KIRK STEERS

Although installing a sound board, a modem, or a CD-ROM drive may not be exactly like performing your own root canal, it's close enough to make many users squirm. Which is one of the main reasons Windows 95 has been so eagerly anticipated: With the release of this new operating system, the promise of Plug and Play for PCs should finally be fulfilled.

What exactly *is* Plug and Play? It's a set of design specifications that allows your peripherals to communicate with your system. More specifically, it's a scheme whereby your PC coordinates the use of the resources—IRQs, DMA channels, I/O addresses, and so on. Add-in cards and other components use these resources to talk to the rest of your system. In the past, installing such hardware meant figuring out which resources your cards and components needed (“My sound card needs IRQ 5, but my network card is already using it—what do I do?”) and then adjusting the cards (usually by setting jumpers) accordingly.

Plug and Play is designed to change all that. Under PnP, your system should be able to allocate resources to components and make the adjustments automatically. Even better, after allocating resources, Windows 95 promises to load the correct driver for new cards, making the installation procedure even less of a hassle. For a computer to be fully Plug and Play capable, at least three system elements must meet the PnP spec: the PC's BIOS, the operating system, and the add-on devices (modems, sound cards,

and so on). PnP BIOSes have been available for over a year and are now standard on most new systems. The first PnP peripheral cards debuted over a year ago. With the arrival of Windows 95—a PnP-aware operating system—the Plug and Play triangle is finally complete. (In some cases, the triangle becomes a square: If you're using a laptop with a PC Card modem or network adapter, for example, your *apps* will also have to be PnP aware.)

Now that all three components of Plug and Play are here, the big question is, does it work? According to our tests, the answer is yes—most of the time. When all the system components meet the Plug and Play requirements, installation is a breeze. But, if the components aren't Plug and Play, it's sometimes a different story.

The Full Regimen

We started with two computers—a Micron P90 PowerStation and a Digital Celebris XL P120—each loaded with a PnP BIOS and a late beta of Windows 95. Next, we selected

a mixture of 30 add-in cards—graphics and sound boards, network interfaces, SCSI adapters, and one modem—all of them from market-leading vendors (see “Phase I: We Plug, Most Cards Play”). Of the 30 cards, 13 claim to be PnP (see “Spotting a Plug and Play Card”); the rest were non-PnP (or “legacy”) cards. Fourteen were designed for PCI, the others for ISA.

Our first phase of testing was simple: We installed one board at a time in the Micron system and checked to see if it worked. Microsoft has claimed that with Plug and Play, users should need no more than 2 minutes to install a new card. We were more generous: We'd allow 15 minutes for each card. If we couldn't get a board to work in that time, it didn't pass the test.

When you install a new Plug and Play card in a system with a PnP BIOS and Windows 95, here's what should happen: When the system boots, it takes a moment to look for new devices. A PnP card takes this opportunity to tell the system, “Hello, I'm here, and these are the resources I need.” If

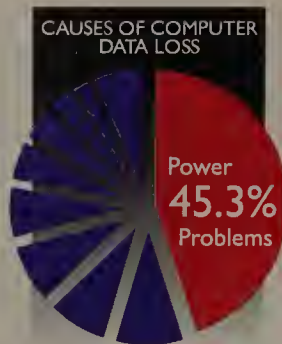


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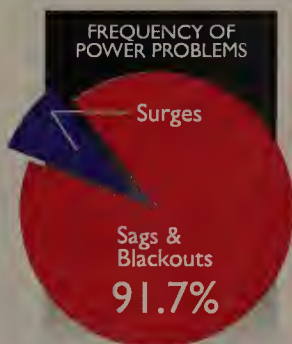


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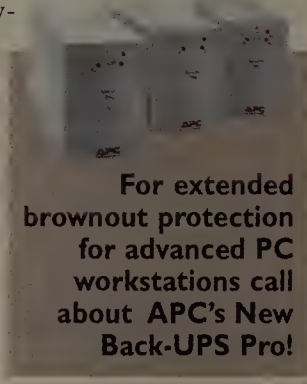
Simply put, if power problems are the least of your troubles, you've got one chance to keep it that way. You insure your car and home with the best policy you can afford. It just doesn't make sense to leave your PC (which is at far greater statistical risk) vulnerable to loss or damage.

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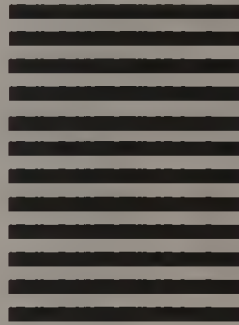
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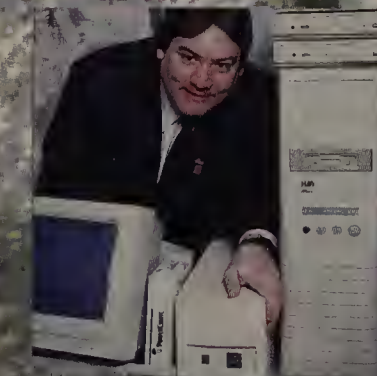
Trial by Fire

Brian Krause, Network Manager for Goodyear Airship Operations, knows how critical APC protection can be. "The night of the All-star game a tornado came through our blimp hanger and took out our roof. Our airships demand absolute communication so I protect our local and remote servers with the most reliable protection I can find: APC. APC's PowerChute software shut our server down in an orderly way... closed out all files nice and neatly. When we reconnected, everything came back up perfectly, without a hitch."



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Doug Welch learns his reliability lessons well: "While still a Computer Science student, I was at home preparing a large spreadsheet for a final project when Anchorage experienced an all too common 5+ Richter earthquake. If not for my Back-UPS 400 it would have been back to square one! I'm now the Network Systems Manager at Charter College, in charge of three networks. I learned my UPS lesson well back in my student days. I've never been disappointed with APC and the product has had quite a work out."



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Faced with a water main break, Mark Conley, Regional Manager of Novell's remote sales office in Detroit was amazed at APC's reliability. "The APC unit was sitting in an inch and a half of water, working just fine, as though nothing was unusual and we lost no data to this disaster. We've used APC here now for at least four years - more than a dozen units are all around the office, and we're well satisfied, so we were even more impressed to learn that the units are amphibious!"



Trial by Water



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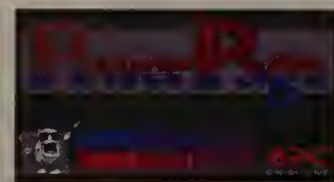
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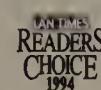
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the system gets this message, it adjusts its resources accordingly, the operating system loads the correct driver, and the card should be ready to work (it may sometimes be necessary to reboot).

This is exactly what happened with the 13 PnP cards we tested. For example, within four minutes of taking Supra's new 144i PnP modem out of the box, we were up and cruising The Microsoft Network—and that includes the time it took to walk across the lab to get a phone cord. We successively installed three PnP network interface cards (one Intel EtherExpress Pro/100 and two 3Com Etherlink IIIs). In each case, we plugged in the card, rebooted, clicked on

A PnP card tells the system, “Hello, I’m here, and these are the resources I need.” If the system gets the message, it should **adjust its resources** accordingly.

Windows 95's Network Neighborhood icon, and watched in wonder as Windows graphically reached out and touched our entire corporate network. Instant connectivity.

Living With a Legacy

Installing our legacy cards was almost, if not quite, as easy. A legacy card can't announce its presence the way a PnP card can. In-

stead, you have to use one of two options in Windows 95's Add New Hardware Wizard.

If you pick the first option—Auto Detection—the system tries to detect the new card. If it does find the card, Windows 95 loads the correct driver and you're in business (you may have to reboot). Microsoft admits that this process, which can take several minutes, may not succeed. But, perhaps because we used new cards from market-leading vendors, Windows 95 correctly detected 13 of the 17 legacy cards we tested.

If Auto Detection doesn't find your card, it kicks you into Manual Install. That means you can either pick the driver that matches your card from Windows 95's database of drivers or install a driver from a floppy. Windows 95's list of drivers currently contains over 2000 devices; according to Microsoft, this covers 80 to 90 percent of the legacy cards in use. If your card isn't in the database, you can try your old Windows 3.x drivers, but beware: You'll have to load them from the DOS prompt, and there are no guarantees they'll work.

We tried Manual Install with the four legacy cards that failed Auto Detection, but we were stymied once again. In all four cases, the blame lay with either our test system or our version of Windows 95. Two Adaptec SCSI adapters ran into a conflict with the Micron's Enhanced IDE controller (Micron and Microsoft each blame the other for the problem). The Turtle Beach MultiSound Monterey sound card and the Western Digital SCSI adapter weren't in Windows 95's drivers database (Microsoft will presumably add them by the time Windows 95 ships), and we couldn't get the cards' Windows 3.x drivers working in our allotted time.

You should note that many of the drivers in the Windows 95 database are written for specific *chips* rather than specific *cards*. For example, when we loaded a Diamond Stealth 64 PCI card, Windows 95 loaded a driver for the card's S3 video chip. These chip drivers may not be the best software for your card, because they won't support

Phase 1 We Plug, Most Cards Play

	Card	Type	Bus	Plug and Play?
PASS	3Com Etherlink III 16 Bit Coax	network	ISA	Yes
	3Com Etherlink III 16 Bit Coax	network	PCI	Yes
	Adaptec AHA-1532P	SCSI	ISA	Yes
	Adaptec AHA-1542CP	SCSI	ISA	Yes
	ATI Technologies Graphics Xpression	graphics	ISA	No
	ATI Technologies Graphics Xpression	graphics	PCI	No
	Aztech Waverider 32+	sound	ISA	No
	CNet PnP PowerNIC	network	ISA	Yes
	Creative Labs Sound Blaster 16	sound	ISA	No
	Creative Labs Sound Blaster AWE32	sound	ISA	No
	Diamond SpeedStar 64	graphics	ISA	No
	Diamond Stealth 64 DRAM PCI	graphics	PCI	Yes
	Diamond Viper Pro Video	graphics	PCI	Yes
Future Domain PNP1630	SCSI	ISA	Yes	
Future Domain TMC-3260	SCSI	PCI	Yes	
Hercules Dynamite Power	graphics	PCI	No	
Hercules Stingray 64/Video	graphics	PCI	No	
Intel EtherExpress Pro/10	network	ISA	No	
Intel EtherExpress Pro/100	network	PCI	Yes	
Matrox MGA Impression Plus	graphics	ISA	No	
Matrox MGA Impression Plus	graphics	PCI	Yes	
Media Vision Pro 3-D	sound	ISA	No	
Number Nine #9GXE64 Pro	graphics	PCI	Yes	
Orchid Kelvin 64	graphics	PCI	No	
Promise Technology DC540	SCSI	PCI	No	
SupraExpress 144i PnP	modem	ISA	Yes	
FAIL	Adaptec AHA-1542CF	SCSI	ISA	No
	Adaptec AHA-2940	SCSI	PCI	No
	Turtle Beach MultiSound Monterey	sound	ISA	No
	Western Digital WD7296	SCSI	PCI	No

We installed the cards one at a time, allowing ourselves a maximum of 15 minutes to get each to work.

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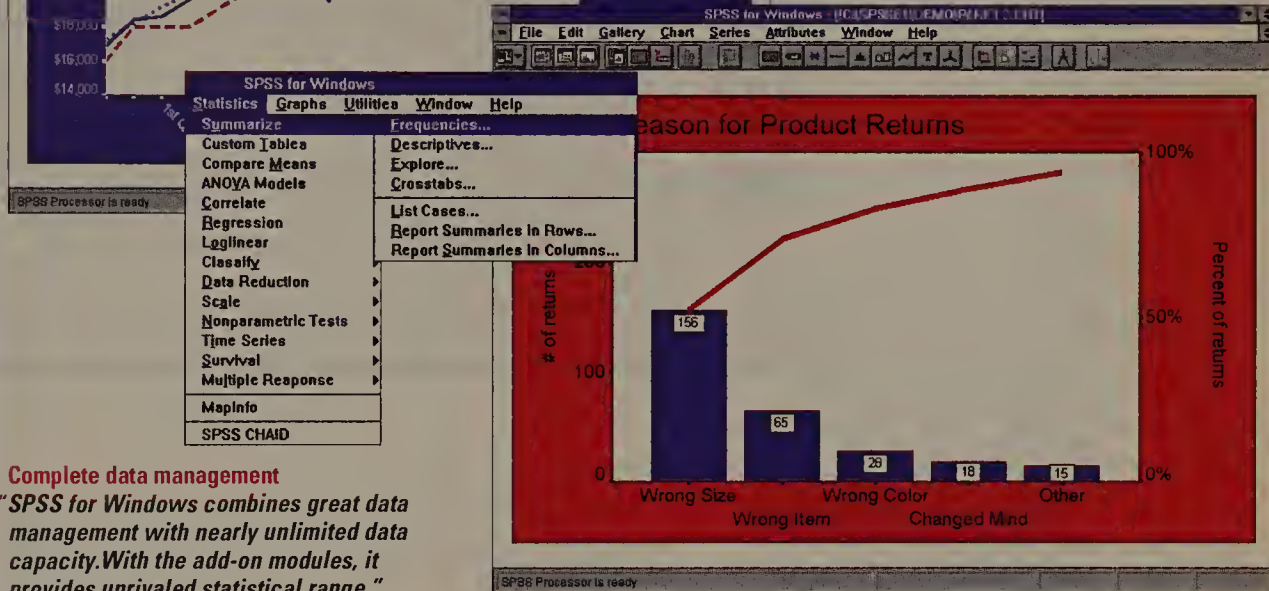
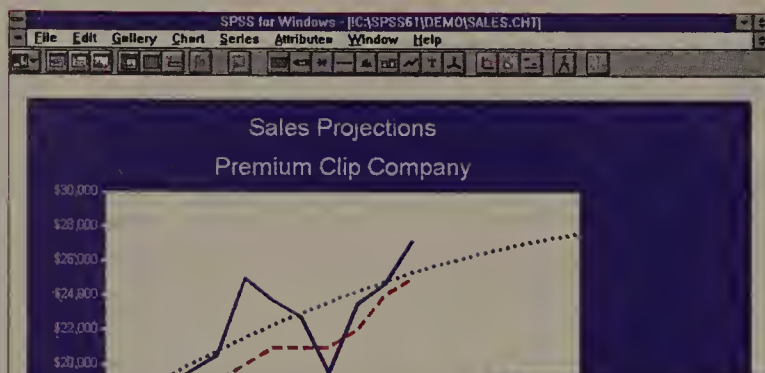
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some board-specific functions; in our experience, these drivers deliver basic functionality. Microsoft expects to continue updating its database (for example, Diamond says drivers for its cards will be in the database by November), and board vendors may well supply updated Windows 95 drivers directly to end users.

The Big Bang

Next, we moved on to a second, tougher phase. We created three groupings of boards, with one card from each of four categories (graphics cards, sound boards or modems, network interfaces, and SCSI adapters). Group 1 consisted entirely of PnP cards (lacking a PnP sound card, we used Supra's PnP modem); Group 2 was composed entirely of legacy cards; and Group 3 was a mix (see "Phase 2: All Together Now"). For each group, we installed all four cards at once; if that didn't work, we installed the cards one at a time.

Phase 2 All Together Now

	Card	Type
GROUP 1 All Plug and Play	3Com EtherLink III 16 Bit Coax	network
	Adaptec AHA-1532P	SCSI
	Diamond Stealth 64 DRAM PCI	graphics
	SupraExpress 144i PnP	modem
GROUP 2 All Legacy	Creative Labs Sound Blaster 16	sound
	Diamond SpeedStar 64	graphics
	Intel EtherExpress Pro/10	network
	Promise Technology DC540	SCSI
GROUP 3 Mixed	ATI Technologies Graphics Xpresslon	graphics
	Future Domain PNP1630	SCSI
	Intel EtherExpress Pro/100	network
	Aztech Waverider 32+ ¹	sound
	Media Vision Pro 3-D ¹	sound

We installed each grouping; if that failed, we reinstalled cards one at a time.

¹ Substituted Aztech Waverider 32+ with Media Vision Pro 3-D.

The verdict on the all-PnP combo: paradise. Windows flawlessly detected and installed all four devices in our test systems, pausing only to request an occasional reboot.

having trouble with the Aztech Waverider 32+. After replacing the Waverider with a Media Vision Pro 3-D, all four cards worked in the Micron system. But when we installed the same cards in the

Digital Celebris, Windows 95 insisted on launching in "safe mode"—its stripped-down, troubleshooting guise. Even then, we were never able to get the combination to work.

So does Plug and Play work? It certainly works better than the old way of doing things. As card vendors release more PnP devices and system vendors sell more PnP systems, installing new hardware will get easier. But installing and configuring legacy cards will likely remain a headache for years to come—which means those of us making the transition to Windows 95 and its promise of Plug and Play will have to step carefully for a while.

Kirk Steers is a performance analyst in the PC World Test Center.

Spotting a Plug and Play Card

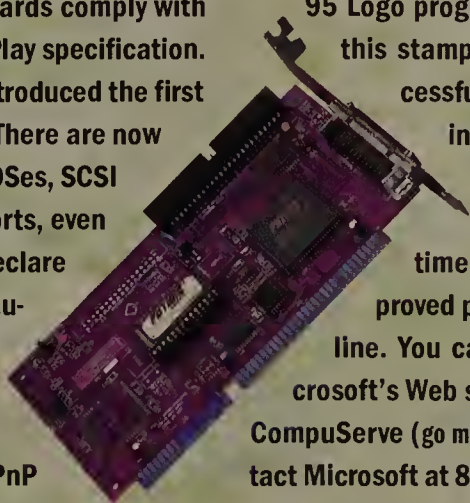
Many vendors claim to have PnP cards, but what does that really mean? In one sense, it means the cards comply with the official Plug and Play specification. Microsoft and Intel introduced the first of these specs in March 1993. There are now PnP guidelines for ISA cards, BIOSes, SCSI devices, serial ports, parallel ports, even monitors. These design specs declare how each device should communicate its identity and its resource needs to the rest of the system.

What about PCI? There's no PnP spec for PCI cards because, theoretically, PCI was designed from the ground up to be Plug and Play compliant. Many vendors say their PCI boards are PnP compatible by definition. But there are ambiguities in the PCI spec. According to Microsoft, testing with Windows 95 has found

ing properly with the operating system."

That's why Microsoft came up with its Windows 95 Logo program. To earn the right to bear this stamp of approval, cards must successfully complete a series of tests—including Plug and Play compatibility checks—at the Microsoft Compatibility Labs. At press time MCL had a list of 50-plus approved products, with more in the pipeline. You can download the list from Microsoft's Web site (<http://www.microsoft.com>) or CompuServe (go msl); modem-less users can contact Microsoft at 800/426-9400.

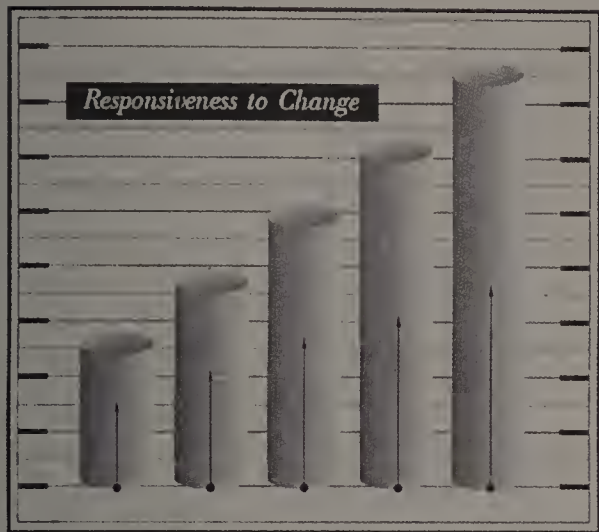
In short, while you can't rely on PCI to get Plug and Play, you should be able to trust officially tested-and-logo'd PnP devices. Look for the logo and—assuming you're using a PnP operating system like Windows 95 and a PnP BIOS—installation should be a snap. —K. S.



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by convention, bureaucracy and big-spending.

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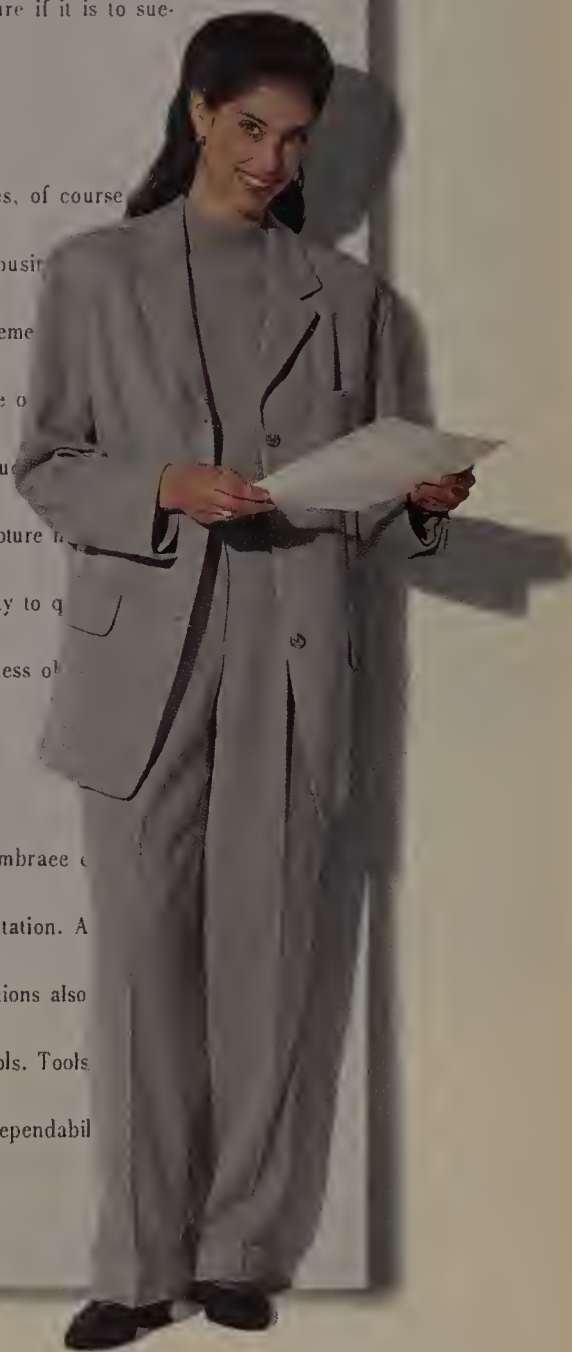


Whether it's in sales or finance, realty or retail, flexibility is the new key to long-term success. In these days of doing more with less, the way in which companies allocate resources has changed. In the past, financial clout often determined who came out on top. Today, faced with competitive and market pressures unimagined ten years ago, companies must now find

Flexibility and a sense of adventure must be a part of any company's corporate culture if it is to succeed into the 21st century.

Large companies, of course, face a greater challenge than small businesses. They generally have an easier time implementing change. But no matter what the size of the company, those with an adaptable structure and a forward-looking outlook are better positioned to capture market share than their competitors; their ability to quickly pivot their focus, or even redefine, their business objectives ensures their continued success.

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Notes From the Usability Lab

In the shoot-out between Windows 95 and OS/2 Warp, are users the winners, or do they just get caught in the cross fire?

BY NAOMI WISE

Like a tall stranger riding toward a lonely western town, Windows 95 is on the horizon. Waiting for it with pistols drawn is its rival, OS/2 Warp 3, the only other 32-bit operating system targeted toward the average user. As far as the townsfolk are concerned, one of these gunslingers has to be ridden out of town on a rail.

If either operating system is to succeed, it will have to attract tens of millions of people who are now using—and are used to—Windows 3.1. We wanted to see how easy it was for experienced Windows users to adapt to these operating systems, neither of which resembles the familiar Windows 3.1 user interface. So the PC World Test Center brought in five human guinea pigs and watched closely as they attempted to run



Jane: Navigating Windows 95, “I felt I needed a Help section called ‘How to use the Help.’” While under OS/2 Warp, “Even the way things were categorized **was cockamamy.**”

through the mazes Microsoft and IBM had set up for them.

In choosing our victims, we looked for people whose skills matched those of *PC World*'s readers. We only considered people with a year or more of regular Windows experience and who, at the very least, could install applications, create subdirectories, switch between active applications, and proficiently use a Windows-based word proces-

sor. Anyone with previous OS/2 or Windows 95 experience was disqualified.

In the end, there was no contest. Everybody loved Windows 95, while most found Warp as friendly as a cornered rattlesnake. Our testers struggled courageously to finish one task after another in OS/2, but even

when they succeeded, much of the time they didn't know what they had done and couldn't repeat it.

The Magnificent Five Assemble

To protect them from angry lynch mobs, we're not using our five heroes' real names. But here are their alternate identities:

- “Charlotte Bronson” has two years of Windows, six years of Macintosh, and a decade

of DOS use under her belt, and has used a vast range of Mac and Windows graphics, writing, and business applications.

- “Yulla Brynner” has five years' experience using both Windows and the Macintosh in administrative work. She's used Excel and several Windows word processors.

- “Jane Coburn” has a year of Windows use and two years of Macintosh experience, performing administrative work using various word processors as well as Excel.

- “Steve McQueen” has used Windows for about three years, often with Central Point's PC Tools. He's used Quattro Pro plus several word processors and Internet front ends.

- “Robert Vaughn” learned a host of business applications during eight years of Windows use and two years with the Macintosh. He can program in C and knows UNIX.

As a first order of business, we invited our testers to spend 20 minutes getting acquainted with each operating system. If they had to, they could call “tech support”

(hidden test administrators) if they became hopelessly stuck. Such calls were recorded as debits in each product's final scoring.

Right away, they preferred Windows 95. "Sufficient info to get started," was Steve's summary. Charlotte was openly enthusiastic: "The great thing I finally discovered about this Help function is its ability to launch right in...to whatever it is you're asking for help on." She also appreciated the Help system's "What's New" entry, where she found an array of fixes for previous Windows shortcomings (a new defragmenter, no PIF files). Robert, however, was annoyed by some built-in touting of other Microsoft products.

Jane had more to be annoyed with: "I felt I needed a Help section called 'How to use the Help system.'" The problem, carried over from Windows 3.1, is that users can't always tell which help they should summon—the main help index or the one attached to an application.

Warp has three independent help systems (the tutorial, the information index, and the fax module help) that appear to be estranged from each other, and the help index often lacks common names for functions (for instance, if you look for *search* instead of

find, you won't get anything). Robert managed to keep the tutorial on screen while he worked, but then he ran up against the help index, which "didn't work and didn't tell me anything about a Seek and Scan Files function."

Many of our users felt that IBM expected them to memorize the tutorial and documentation, which seemed more appropriate for teaching programming concepts than immediate user skills. Charlotte articulated most testers' objections: "I've never seen anybody take so long to explain so lit-



Robert: "OS/2 parallels the process I would use to perform the tasks." **Charlotte:** "I'd throw it in the garbage. It's like a really bad joke, a cruel, cruel joke."

tle. That's just the kind of stuff that gets people afraid of computers in the first place." On the other hand, Yulla commended Warp's help for its brevity: "Very accessible...The writing was concise and clear."

The greatest problem our heroes had in learning OS/2—a difficulty that came up again and again—was dealing with Warp's warped choice of words. Like some rabid

academic redefining the world in a monograph, Warp renames many familiar functions: Wallpaper is "scheme palette," while "Find" may also be "Seek and Scan" or "Locate," depending on what you're looking for. And everything (a file, a folder, a printer) is an "object"—a word that intimidates almost all nonprogrammers.

"Even the way things were categorized was cockamammy—creating a printer 'object.' Or 'locate' and 'find' in the same dialog box," Jane complained. Both Charlotte and Steve used the term "backward logic" when

they separately conquered a difficult task by choosing the option they considered least likely to succeed.

Running the Gauntlet

NAVIGATION. Aiming for a "clean desktop" look, Windows 95 hides most functions behind a Start button. From there, users were able to reach almost anything they needed and create on-screen shortcuts for instant access to the files and applications they wanted. Once they "got it"—and it didn't take long—all our subjects adapted to the "stylish" desktop swiftly. Steve's "Lousy wallpaper" was the most critical comment.

Robert took a shine to Warp's navigation tools, observing that it "parallels the process I would use to perform the tasks." Others disagreed. According to Steve, "The OS/2 desktop looks like my real desktop at home—disorganized and chaotic."

Warp's desktop has numerous icons—plus a large "Launch Pad" near the bottom. This button collection gives you easy access to many, well, objects—two of which are drives C: and A:. But if you've got a partitioned hard disk, two floppies, or a CD-ROM drive, you have to go to the OS/2 System folder—a place where many navigation and housekeeping tools are hidden—to get to the other drives. More file management and search functions are in yet another location, the "Productivity folder."

Changing the common mouse-work par-

Testers Under Glass

Each tester spent an 8.5-hour day in the PC World Test Center, assaying both operating systems while two test administrators videotaped their struggles from behind one-way glass. The testers never met one another or had an opportunity to compare notes.

Three testers tried Windows 95 first; the other two started with OS/2. The testers got 20 minutes to become familiar with each environment, exploring on-screen tutorials, help systems, and printed documentation. Then, each tester was assigned the following tasks:

NAVIGATION Find a file, knowing part of the file name. Find another, knowing only a phrase inside the file. Create a pointer to a program (a *shadow* in OS/2, a *shortcut* in Windows 95). Find a file on a CD-ROM.

HOUSEKEEPING Create a folder (what DOS calls a directory). Copy the contents of a floppy

to a folder. Move a folder to another drive. Add a printer driver. Delete a file. Restore it.

RUNNING APPLICATIONS Launch applications written for Windows 3.1, DOS, and the current operating system. Switch between applications. Switch printers. Fax a file. Copy data between applications.

We encouraged these poor souls to comment and cuss aloud as they worked. The toilers then rated each task from 1 to 5 (with Windows 3.1 preset at 3—the scale's median) and wrote down comments and observations. They completed "likes/dislikes" tables for each system, naming their three favorite and least favorite features. When they'd finished the written ratings, a test administrator conducted a 10-minute debriefing to elicit further comments about their experiences. —N. W.

Windows 95 Proves Easier to Use

	Windows 3.1	OS/2 Warp	Windows 95
Ease of learning (10%)	3	2.6	3.5
Navigation (20%)	3	3.2	4.3
Housekeeping (25%)	3	2.7	4.4
Running applications (25%)	3	3	3.8
Overall satisfaction (20%)	3	2.6	4.2
Weighted score	3	2.8	4.1

Our testers scored each group of tasks on a scale of 1 to 5, with Windows 3.1 preset at 3. Windows 95 coasted to an easy victory.

lance, OS/2 uses the right button to drag and drop. Then, to be fair to lefties, it avoids the politically incorrect name “right button,” preferring “Button 2” instead. Our testers considered this whole change a sinister plot.

When you start a file search in Warp, the dialog box puts an asterisk in the file name space; several testers initially didn't realize they had to delete it before they could enter a name accurately. Shadow logic also caused serious difficulties for the group. Charlotte, for instance, accidentally created *shadows*—pointers to programs or files—of the OS/2 System and Productivity folders. “You know, this is really scary,” she said. “You can create shadows of shadows of shadows of shadows, pointing all over the place in different directions.”

Like IBM, Microsoft introduces some new vocabulary. For instance, the old File Manager is now the venturesome “Explorer.” But none of our testers remained confused about nomenclature for long.

HOUSEKEEPING. Windows 95 fared best in its housekeeping functions. People had no trouble creating folders, moving files, or handling other such basic tasks. And when it came to installing a printer, the Printer Wizard took all the guesswork out of the job.

Housekeeping under Warp, our domestics found, was just slightly easier than cleaning the Aegean stables. For instance, although OS/2 has a fairly simple way to create a folder, none of our testers found it—all five completed this job via laborious multifold dragging. Jane's total comments on the six housekeeping tasks were: “fire,” “flood,” “famine,” “doom,”

again but had to enter a DOS-like command, complete with path. “It's supposed to not be a command-line system,” Robert said as he completed the task. “It seems contrary to the purpose of a GUI.” Interestingly enough, we found that a default installation of Warp has no Undelete option—you have to consciously turn it on. (However, once you delete an application, OS/2 automatically deletes its icon and presumably all other traces of it—a nice, clean removal that Windows could use.)

RUNNING APPLICATIONS. Our sufferers had little difficulty launching or switching between DOS, Windows, and native applications in Windows 95. Several users were pleased at the pop-up visual cues that helped them <Alt>-<Tab> through programs. Surprisingly, it didn't occur to most testers to try the taskbar lurking at the bottom of the screen.

Speaking of <Alt>-<Tab>, many users attempted to switch tasks that way in Warp, only to discover that it wouldn't take them to DOS programs or OS/2 command-prompt windows. And a couple of

Steve: “Windows 95 is even significantly better than the PC Tools shell that I use **and love.**”

testers tried minimizing an application window, only to see it disappear from the screen entirely (OS/2 places iconized programs into a special folder).

Faxing got mixed reactions. Three testers commented favorably on Windows 95's Fax Wizard (“It holds your hand,” said Yulla,

“defeat,” and “despair.” Robert more temperately noted, “The Launch Pad should come preconfigured with a button for housekeeping tasks.”

Whereas Windows 95 has a quick and simple ‘Undelete’ from its Recycle Bin, once users dumped a file in OS/2's Shredder, they couldn't just drag it out

and Charlotte felt OS/2's fax tool was pretty spiffy. But neither program's fax help was included in the main help index, nor did either one direct users to the easiest and most common fax method of all: switching printers within your application and “printing” to a fax machine. IBM apparently felt that the word *fax* was too prosaic, and named its fax “printer” ‘HP LaserJet III on LPT3’. Only Steve figured this out, deducing the cryptic meaning from the fact that there were only two printer ports on the test machine.

Steve, Charlotte, and Robert all noted among their three top OS/2 dislikes that when it came to running applications (especially saving files in Windows applications),

“Will You Upgrade?”

	To OS/2 Warp	To Windows 95
“Charlotte”	No	Yes
“Jane”	No	Yes
“Robert”	Yes	Yes
“Steve”	No	Yes
“Yulla”	No	Yes

Warp seemed slow: “The cost in speed is terrible,” said Robert. No one commented on Windows 95's speed.

The Battle Ends

Even before the results were statistically tabulated, it was obvious which desktop would win. Final impressions of OS/2 said everything. Yulla was diplomatic: “So many of the same things were easier in Windows 95.” Charlotte's assessment was more direct: “OS/2? I'd throw it in the garbage. It's like a really bad joke, a cruel, cruel joke.”

But when it came to Windows 95, they liked it, they really liked it—and the most computer-sophisticated users liked it best. “Vastly improved over Windows 3.1 and even significantly better than the PC Tools shell that I use and love,” said Steve. Charlotte summed it up with, “I'm a Windows 95 cheerleader.”

Naomi Wise is a San Francisco-based freelance writer and frequent PC World contributor. Tests designed by Martin Marshall and conducted by Susan Silvins.

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Is Windows 95 Faster?



For Windows 3.1 users considering an operating system upgrade, one big question is whether Windows 95 is faster. Another is whether to upgrade applications. We probed these issues by testing old and new Windows software on a beta version of Windows 95 in two memory configurations. The answer came down to this: Windows 95 won't necessarily run your old programs as fast, and, more telling, you need 16MB of RAM to reap real performance benefits. Of course, the shipping version could prove faster.

We used identical macro-driven tests for the shipping Win 3.1 and beta Windows 95 versions of Microsoft Excel and Word, as well as for Borland Paradox 3.5 for DOS. All tests ran on the same 90-MHz Pentium systems configured with 8MB or 16MB of RAM.

First we timed the older programs running their scripts on Windows for Workgroups 3.11 and on Windows 95. Conclusion: On an 8MB system, Windows 3.11 ran current Windows applications visibly faster than did Windows 95. However, the beta versions of Excel and Word for Windows 95 outpaced their Win 3.1 ancestors by 29 and 24 percent, respectively, on Windows 95.

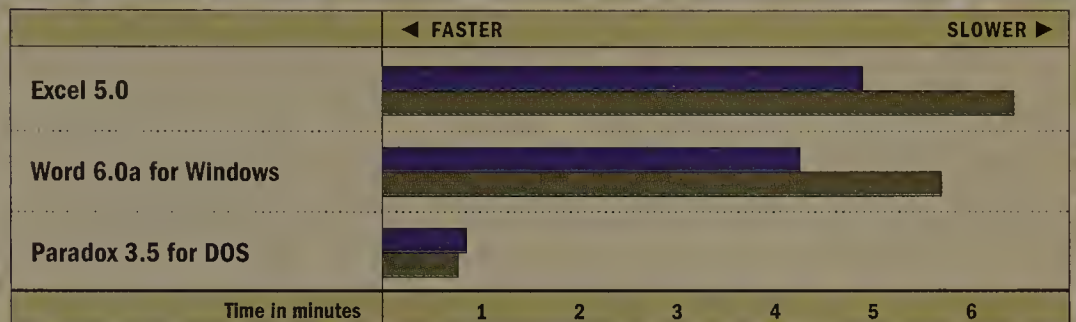
These speeds were still slower than for Win 3.1 apps on Windows for Workgroups. Only when we raised memory to 16MB did Windows 95 get the job done faster.

Just for kicks, we tried out the minimum configuration that Microsoft counsels for Windows 95: a 386-class processor, 4MB RAM, and 30MB of available hard drive space. Our verdict: Don't try this at home. You'll regret pressing your vintage 386-based PC into service as a Windows 95 workstation.

PC World will continue to test Windows 95 after the initial August release, and we may see ongoing performance improvements. More important, multitasking may also boost your productivity—a notion we plan to test in the future.

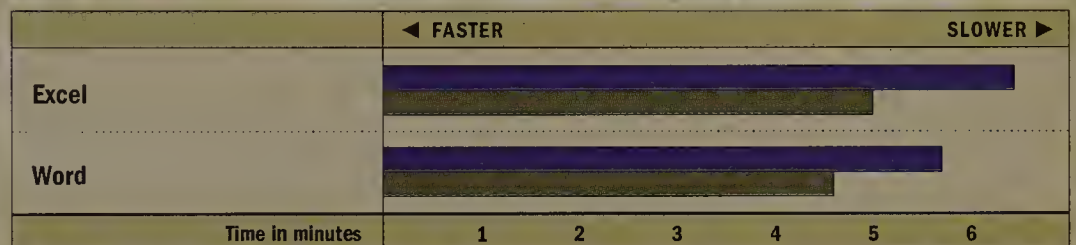
—Susan Silvius

Windows 3.1 Apps Ran Slower on Windows 95



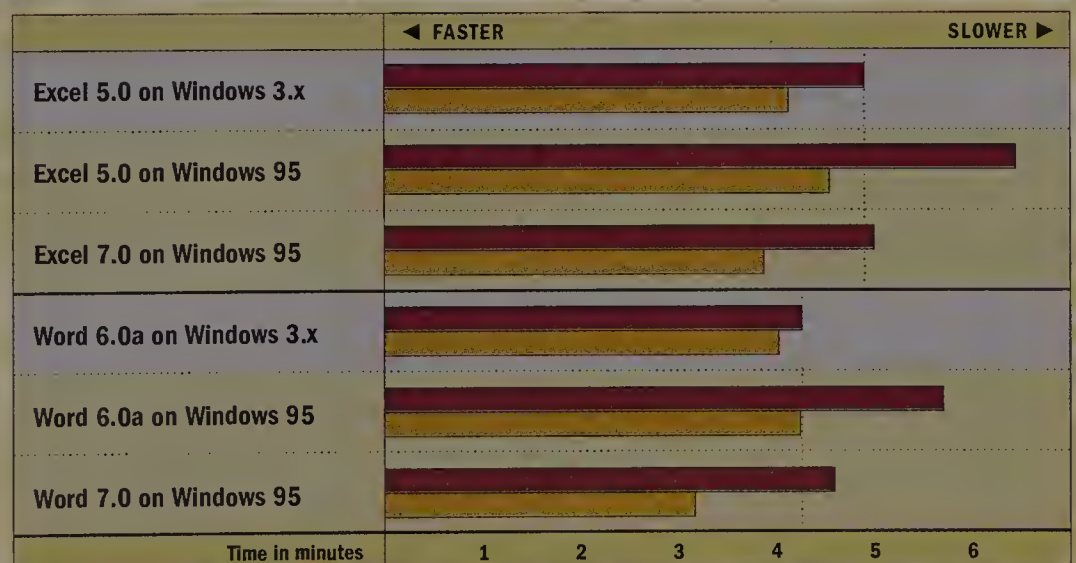
Pentium-90, 8MB RAM ■ Windows for Workgroups 3.11 ■ Windows 95

Windows 95 Apps Ran Faster Than Windows 3.1 Apps



Pentium-90, 8MB RAM ■ Windows 3.1 versions on Windows 95 ■ Windows 95 versions on Windows 95

For Optimum Performance, Use 16MB of RAM



■ Pentium-90, 8MB RAM ■ Pentium-90, 16MB RAM Performance comparison line

Methodology

Tests conducted on a Micron Pentium-90 with 256K of secondary cache, an 820MB EIDE hard drive, and a Diamond Stealth 64 graphics controller with 2MB of DRAM and video resolution set to 800 by 600 with 256 colors. Windows for Workgroups 3.11 used a permanent swap file and had 32-bit file access enabled. Windows 95 used asynchronous write buffer commits, to match 3.11 defaults.

The Word macro opens multiple files, scrolls in

normal and print preview modes, imports a graphics file, inserts a table, changes font attributes, changes column width, and prints. The Excel macro opens multiple spreadsheets, performs several recalculations, creates charts, scrolls, and prints. The Paradox 3.5 macro runs in a DOS window; it enters data, searches records, updates, and generates reports from a customer list.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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More and Better Freebies

Don't you hate paying for something you never use? Take the utilities and applets included in Windows 95. You get them whether or not you want them. But are they worth the hard disk space they consume? The answer is a qualified yes.

Microsoft has beefed up the programs included with Windows 95. Some applets, such as the Quick View file viewer, are long-overdue additions. Others are more capable versions of old Windows 3.x tools; for instance, HyperTerminal replaces the underpowered Terminal program. The applets are 32-bit and take advantage of features such as multitasking and *shortcuts*, or pointers.

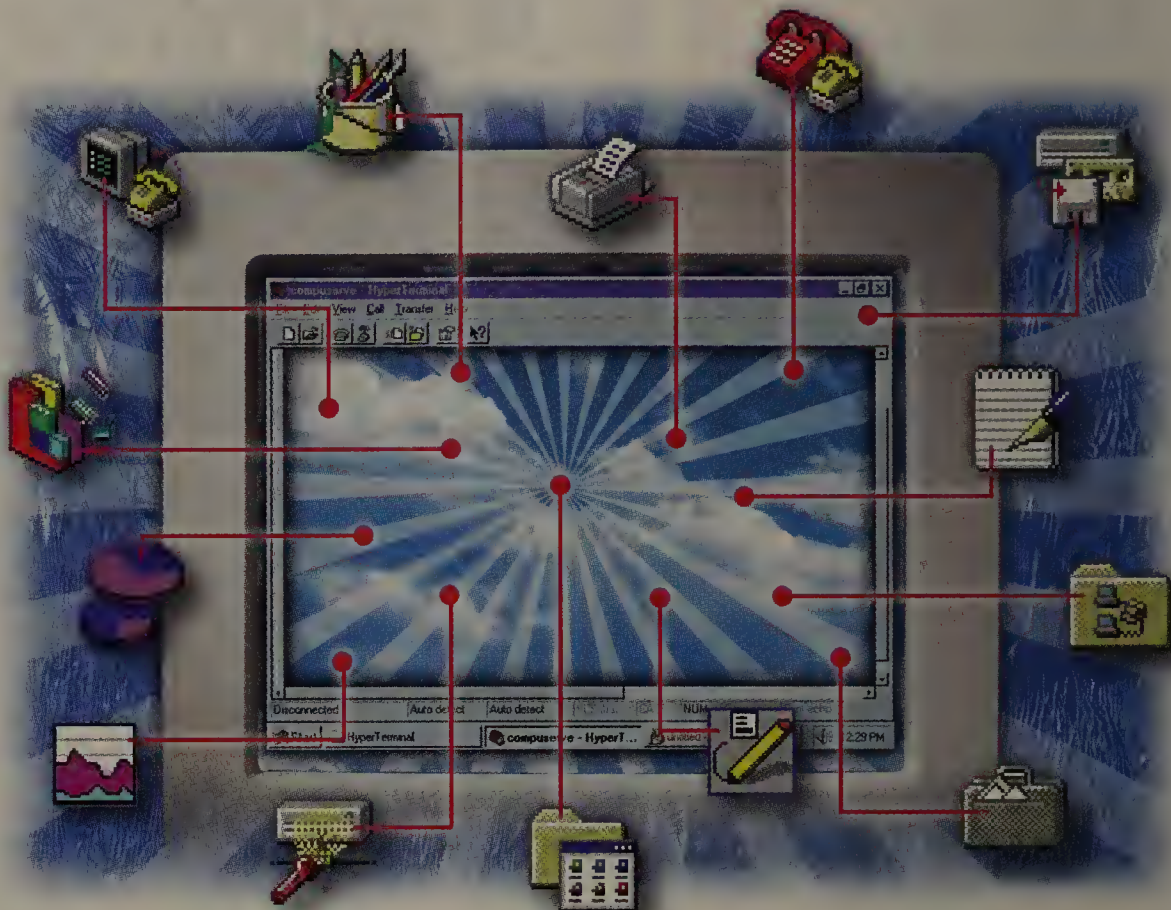
Some applets have hardly changed since Windows 3.1, including Notepad, Character Map, and Calculator (except for a bug fix). And one applet promised for Windows 95—a personal information manager combining Calendar and Cardfile—didn't make it into the final release. (If you install Windows 95 over Windows 3.x, both applets will remain on your hard drive.) The new applets and utilities take you further than their predecessors, but you'll still find them limiting.

No-Frills Communications



HyperTerminal replaces the Terminal emulation applet of Windows 3.1. The new product is easier to use than its predecessor and adds more functionality and speed. For those who log on to BBSs or character-based online services, such as CompuServe or MCI Mail, this product could fill the bill.

Windows 95 communications technology makes HyperTerminal simple to set up. With Terminal, you had to enter confusing modem and port settings manually in dialog boxes; now Windows 95 handles that for you. It determines what kind of modem you have and which port it's attached to, then config-



ures itself. And this works...most of the time. In our beta version, the installation ran successfully. But when we moved the modem to another port, the system insisted the device was attached to the original port, and we had to change the settings manually. The Auto Detect feature further eases setup by letting you dial in to online services without entering arcane communications settings.

HyperTerminal supports twice as many terminal emulations as Terminal and faster, more reliable binary file-transfer protocols such as Zmodem. But it won't replace com-

mmercial communications packages for many users, because it lacks scripting and a window to create messages offline.

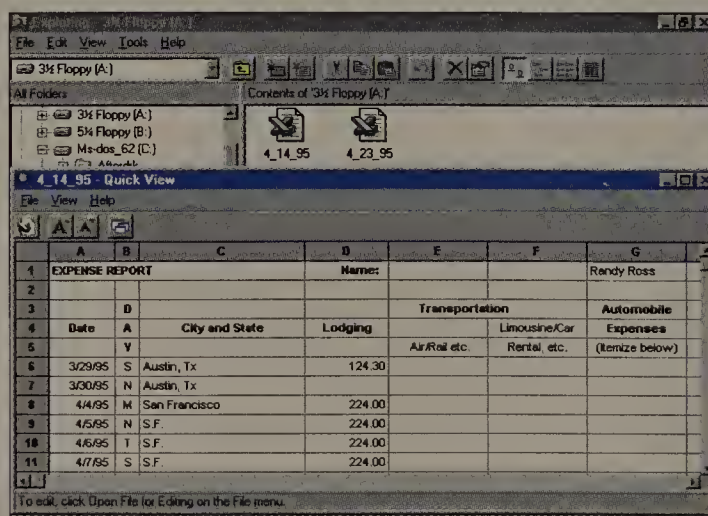
See Your Data



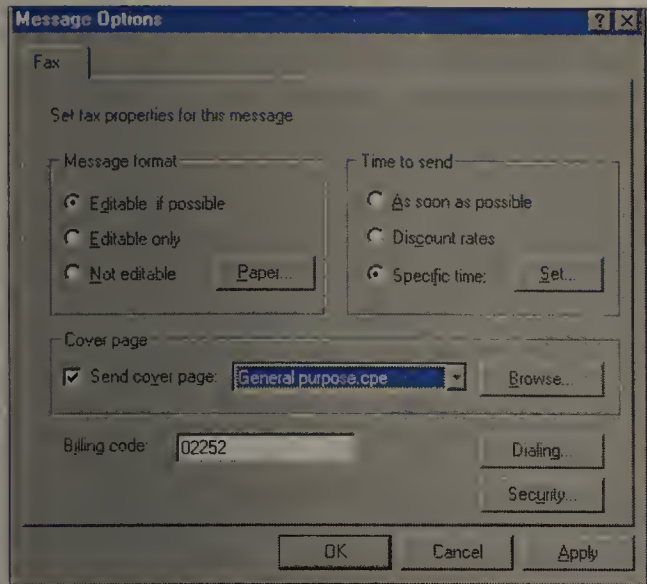
Windows 95 includes a feature called Quick View that lets you see the contents of a file without first opening the application in which it was created. This capability was previously available in add-ons such as Norton Desktop, but not in Windows itself. Even though Windows 95 supports long file names, much of your data may still reside in older files that have cryptic eight-character names, and Quick View helps you locate these old files faster.

To invoke Quick View from Explorer, place your pointer on a file name and right-click. If the file can be read, you'll see Quick View as a menu choice; when you select it, the contents of the file display in a window. Quick View supports about 30 file formats used in popular applications.

On the downside, Quick View can't open a file if it doesn't recognize its extension. We add extensions like '.rr' to identify a file's author, but when we tried to open a Word



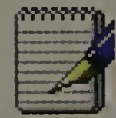
With Quick View, Windows (finally) lets you peer into a file without loading the app that created it.



Desktop faxing has gone standard. With the right modems, you can also transfer files.

6.0 document called 8nphware.rr, Quick View didn't even appear as a menu option. Other limitations: You can't view objects or graphics embedded in files, and you can't print or cut and paste from the viewer to other applications. However, to get these features—as well as viewers for 175 additional formats—you can buy Inso's Quick View Plus upgrade for \$45.

Your Pad or Mine?



WordPad replaces the anemic Write program included in Windows 3.1 and adds enhancements. But if you're hoping to save money on a word

processor by using WordPad, don't bother: The program omits too many features that serious writers need.

First, WordPad doesn't provide crucial tools like a spelling checker, a thesaurus, or word-count capabilities, and it doesn't support macros. Don't expect to do any fancy formatting. WordPad lets you set margins, but you can't create multicolumn documents. And the applet only reads from and writes to Word 6.0, Write, ASCII text, and Rich Text file formats.

Still, WordPad offers improvements. A toolbar sports icons for commands such as Open, Save, and Print. Other icons let you change paragraph alignment or attributes such as bold and underline. WordPad also includes print preview.

Better Paint With Less Pain

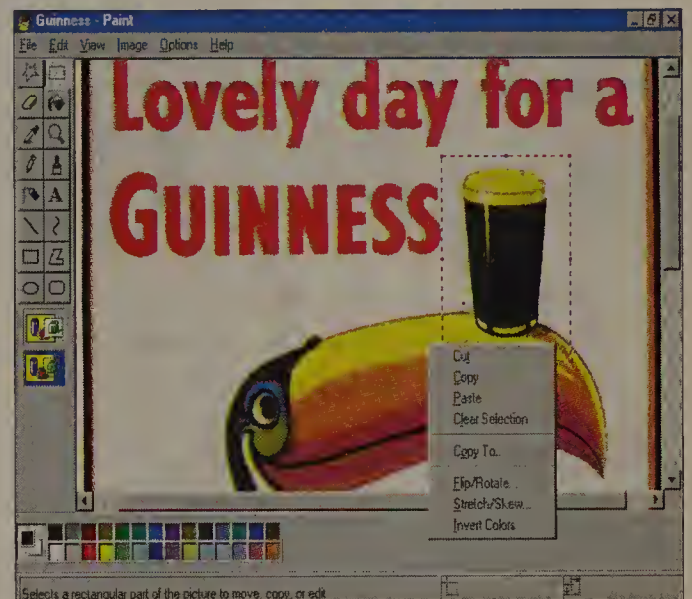


Although Windows 95's Paint applet isn't dramatically different from Paintbrush, it will soothe some frustrations. At last, you can remove portions of an image by selecting the area and pressing <Delete>. And you can paste images in their entirety into the editing

area (whereas Paintbrush mercilessly cropped them to fit).

The interface is also better, with sculpted dialog boxes and buttons, shortcut menus, and *ToolTips*, which display a description of a tool when you point to it. Paint's improved text editing allows you to change the font, color, and size of text before adding it to an image. Selection handles let you size and skew images by clicking and dragging.

New tools include Pick Color (to copy



The improved Paint accessory is actually useful, with better text handling and image pasting.

color between objects) and Zoom (to magnify specific areas of an image). With Print Preview you can view an image before printing, although you can't edit in this mode.

Windows 95 Applets and Utilities: Better...and Bigger

	Windows 3.1	Size	Windows 95	Size	Comments
ENHANCED	Write	282K	WordPad	1.4MB	Better word processor, but it's no Word
	Terminal	181K	HyperTerminal	512K	Easier to set up than Terminal, adds Zmodem
	Paintbrush	226K	Paint	1.3MB	Better interface, improved text support
	At Work Fax	1MB	Microsoft Fax	3.1MB	Fax Wizards, cover pages, personal address book
ADDED			Quick View	1.9MB	Pop-up file viewer; stumped by unknown file types
			Briefcase	2.1MB	Moves and synchronizes files between PCs
			Dial-Up Networking	512K	Remote-node access software (client only)
			System Tools	18MB ¹	Backup, Disk Defragmenter, DriveSpace, Inbox Repair Tool, Net Watcher, Resource Meter, ScanDisk, System Monitor, WinBug

Calendar, Cardfile, and Clock have been eliminated from Windows 95, but the old Windows 3.1 Calendar and Cardfile will remain on upgraded systems; Clock has migrated to the Taskbar. Unchanged or minimally changed applets include Calculator, Character Map, Clipboard Viewer, Media Player, and Notepad.

¹ Approximate.

New applets and utilities bundled with Windows are more powerful and sport better user interfaces. But note also how much more disk space the Windows 95 versions require. You may choose to delete them after installation.

Fax for the People



Who hasn't wished for the ability to send a fax from a PC instead of hiking down the hall to the fax machine? Microsoft's Fax applet makes this possible without requiring a third-party program. Users of Windows for Workgroups 3.11 will be familiar with At Work Fax but will find new twists in the Windows 95 version, including a fax cover page editor and Fax Wizards that guide you along.

Fax is integrated into the Exchange client, which also includes a Microsoft Mail client and access software for The Microsoft Network. You can create an address book, specify when to send faxes, and attach files to faxes. If both sender and receiver have Windows 95 and Group III, Class 1 modems, files can be sent in binary form.

The applet offers three ways to send a fax: from Windows applications by using the

Print to Fax driver, from Microsoft applications via the File•Send command, and from Exchange. Faxes you send and receive are stored in your inbox. Finally, if you have file and printer sharing rights, you can share your fax-modem with others.

In the Utility Closet



When you install Windows 95, you will have access to

many utilities to help you run a clean machine. The lineup, which you'll find in the System Tools menu, includes a few of the utilities that came with DOS 6 plus simplified versions of some Windows NT tools.

As with previous releases of DOS and Windows, some of these are stripped-down versions of commercial utilities. The Backup tool now comes from Hewlett-Packard's Colorado Memory Systems Division; it provides basic file backup with default support for tape drives built by Colorado.

The System Tools include a Disk Defragmenter developed in conjunction with Symantec and a ScanDisk utility from Micro-

soft. The defragmenter optimizes performance by recovering data scattered across sectors, regrouping fragmented files into contiguous blocks, and arranging files and directories in the right order. ScanDisk checks for corrupted files and disk-surface errors.

Microsoft's DriveSpace, a disk compression utility now packaged as an option, frees disk space by compressing data. (DriveSpace in DOS 6.22 had already replaced the controversial DoubleSpace.) And System Monitor offers a view into your computer's vital statistics, tracking and displaying CPU and memory usage, network calls, and disk cache hits.

Enhanced Utilities: When You Need More Than the Freebies

Applet or utility	Commercial version	Availability	Additional features
HyperTerminal	HyperAccess for Windows 95; Hilgraeve; 800/826-2760, 313/243-0576	Ships within 90 days of Windows 95; price unavailable (Windows 3.1 version was \$149)	Programming language, offline editing window, on-the-fly graphics viewing, virus detection for downloaded files
Quick View	Quick View Plus; Inso Corp.; 800/333-1395, 312/329-0700	Ships within 30 days of Windows 95; \$45	175 file formats; ability to view embedded objects and graphics; ability to print, cut, and paste viewed files
Backup	Colorado Backup for Windows 95; Hewlett-Packard, Colorado Memory Div.; 800/416-8596	Ships within 30 days of Windows 95; price unavailable (Windows 3.1 version was \$42)	Plug and Play detection of tape drives; supports more tape drives and high-speed controllers; adds tape rename, unerase
Disk Defragmenter	Norton Utilities for Windows 95; Symantec Corp.; 800/441-7234, 503/334-6054	Ships concurrently with Windows 95; \$120, upgrade \$60	Full range of system and disk management utilities from the company that wrote the book on diagnostic repair tools

Some Windows 95 applets and utilities are subsets of features from commercial products.

Are You Being Served?

The accessories and utilities bundled with Windows 95 consume an order of magnitude more disk capacity than their Windows 3.1 ancestors, but they're largely worth the space. For most simple tasks, they'll fill the bill. And fortunately, as with the earlier releases of Windows, many of the applets are licensed from third parties (see "Enhanced Utilities: When You Need More Than the Freebies"), who will gladly sell you their full-featured versions if you need more functionality.

—Randy Ross, Catherine Kenny, and Peter Scisco

Microsoft Plus Options Extra

Hoping to score extra dollars from every Windows 95 upgrader, Microsoft has announced Plus, a set of utilities that Brad Chase, general manager of the company's personal systems group, calls the "mag wheels and chrome trim for Windows 95."

Expected to sell for less than \$50, Plus includes a system "agent" that monitors and maintains your hard drive in the background, an enhanced version of the DriveSpace disk compression utility bundled with Windows 95, an Internet starter kit, the Dial-Up Networking server component, and an assortment of "desktop themes" that let you customize the look and sound of your computer.

The system agent checks the hard drive during idle periods, defragmenting, compressing, and backing up if requested. The DriveSpace 3 utility supports larger disk sizes (up to 2GB) and higher compression ratios than the free version. It includes an agent that adjusts the compression algorithm file by file to optimize space and performance. DriveSpace 3 is also optimized for Pentium systems, Microsoft says.

The Internet Jumpstart Kit allows one-button sign-up and access to the Internet from The Microsoft Network, using a setup wizard. The kit includes a Web browser called Inter-



net Explorer (licensed from Spyglass), an Internet mail reader that directs messages to the Windows 95 Exchange client, and support for Windows 95 shortcuts so you

can jump to favorite places on the Internet with one click.

Desktop themes include a collection of wallpaper, screen savers, sounds, fonts, color schemes, photo-realistic icons, and animated cursors. You can spend the next year toying with your desktop until you get it just right. Microsoft, 800/426-9400.

Reader service no. 768

—Andy Reinhardt

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The Office Without Walls

Windows 95 brings good news for mobile managers and employees who work in remote offices. The Briefcase accessory, a simple but powerful way to move files between desktop and mobile systems, addresses the problem of synchronizing versions. And Dial-Up Networking, a remote-node program developed with Shiva, provides an easy means to connect to your home or office PC—and any networks to which they may be connected—from the road or a remote office. (Only the client is bundled with Windows 95; to get the server, you need Microsoft Plus. See “Microsoft Plus: Options Extra.”)

Building these features into Windows 95 won't kill off Traveling Software's LapLink, or Shiva's LanRover/E, which still offer more

can overwrite the desktop file with a newer notebook file or vice versa, leave both files as they are, or incorporate changes from both into a third file. Briefcase files also can be split from association with the original file.

Briefcase's versatility and its ability to support any connection between two computers put it ahead of LapLink. But LapLink is better for handling large numbers of files.

One Briefcase shortcoming may surface if you use the accessory while multitasking. File activity can slow the multitasking of 32-bit applications to the point where you start to wonder if the system has hung. But I have not lost any data or had an actual crash in these circumstances.

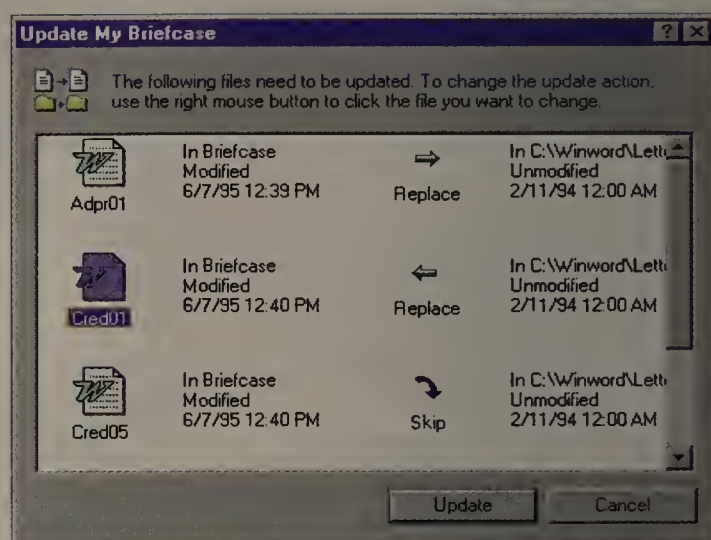
Dialing for Data

With Dial-Up Networking, you can connect to a remote PC or network and use any resource—file, directory, modem, or printer—as if it were attached to your laptop. You may not, however, be able to take direct control of all the software on the PC to which you connect.

That privilege requires a remote-control package like Norton's pcAnywhere.

Dial-Up Networking links through wired or wireless phones or through the Direct Cable Connection utility, using parallel or serial ports. You can hook up to nearly any network, including Windows NT, Windows for Work-

groups, Windows 95, UNIX, and NetWare. You'll encounter one real problem with Dial-Up Networking: It will quickly sour you on the 2400-bps or 9600-bps modem on your laptop. My experience is, the faster



No more floppy shuffle: Briefcase synchronizes files between your desktop and laptop systems.

your network connection, the more it will be used. That's bad for slow modems but good for the state of mobile computing.

For Jim Wiseheart, president of Houston-based Celebration Computer Systems, a telephony service bureau, Windows 95's new features couldn't be more welcome. "I wish I could tell you it's been fun, the way



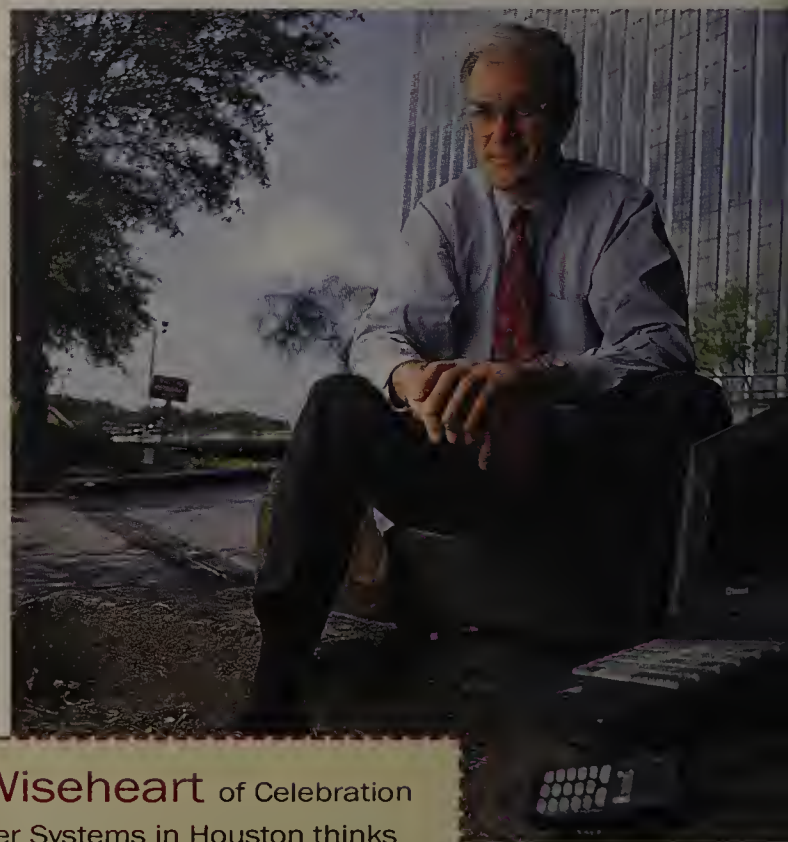
Now you can make a remote connection from your PC to another without an engineering degree.

sophisticated features, but it will put remote computing and file synchronization within reach of many who might otherwise abstain.

Briefly Stated

Briefcase simplifies the job of keeping files current between road and desktop. With your laptop connected to your desktop—by serial or parallel cable, by remote access, on a network, or “linked” via a floppy disk—you can move files from the PC by dragging them to the Briefcase window.

When you're done using the checked-out files, you reattach and run the Update All feature in Briefcase. Your files are automatically synchronized or even, in some cases, merged according to rules you choose. You

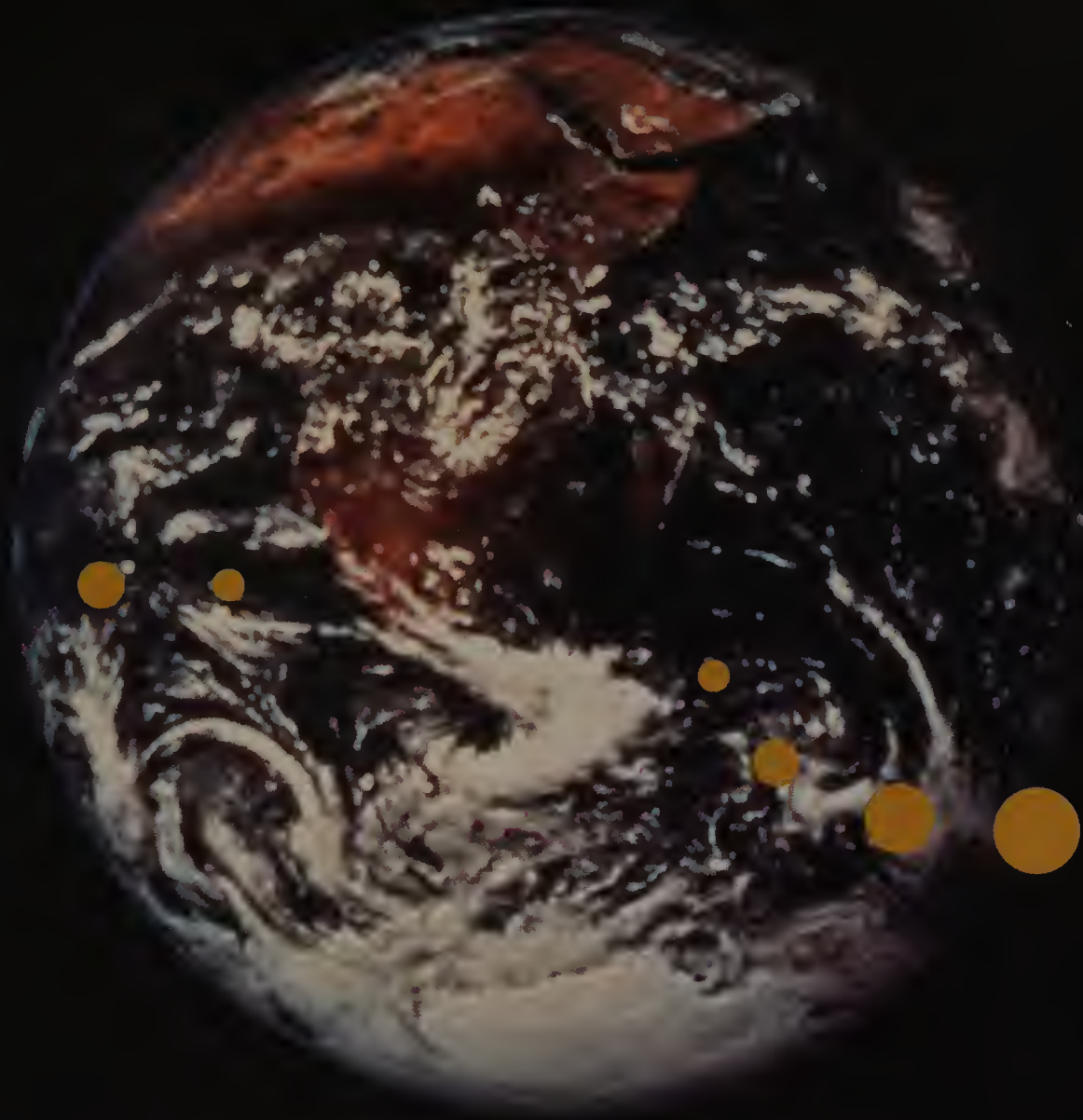


Jim Wiseheart of Celebration Computer Systems in Houston thinks Windows 95 will simplify remote access.

I've been doing things [in Windows 3.1],” says Wiseheart, who does the floppy disk shuffle when working on his laptop at home. “It should be seamless and easy—the way this looks like it might be.”

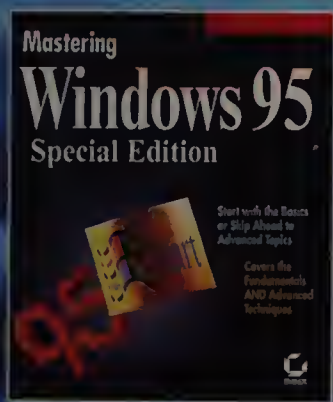
—Joe Abernathy

Well, the
installation
was easy. . .



Now, what
do I do?

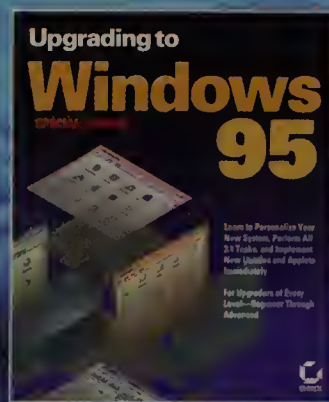
For Complete Windows 95 Coverage



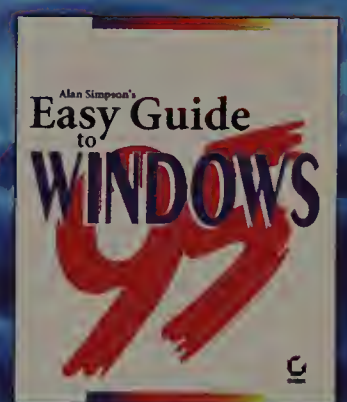
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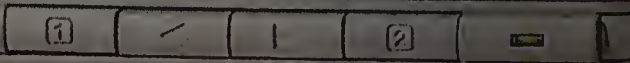


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The Definition of

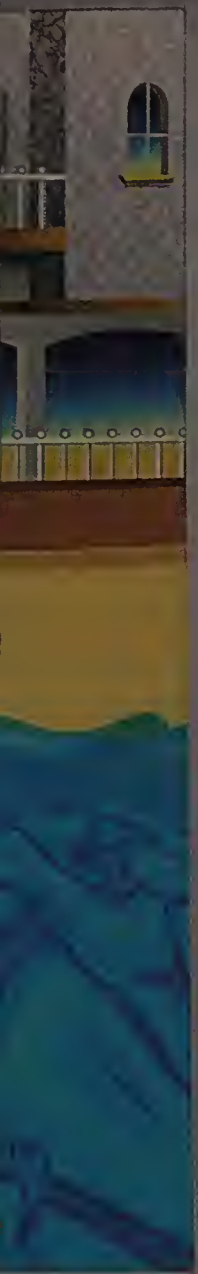


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Circle 224 on reader service card

MSN Links Desktop and Online

The Microsoft Network (MSN) will officially debut on the day Microsoft ships Windows 95. But the service has been up and running for months, and a tour of its user interface and features confirms that it's an impressive offering with groundbreaking features.

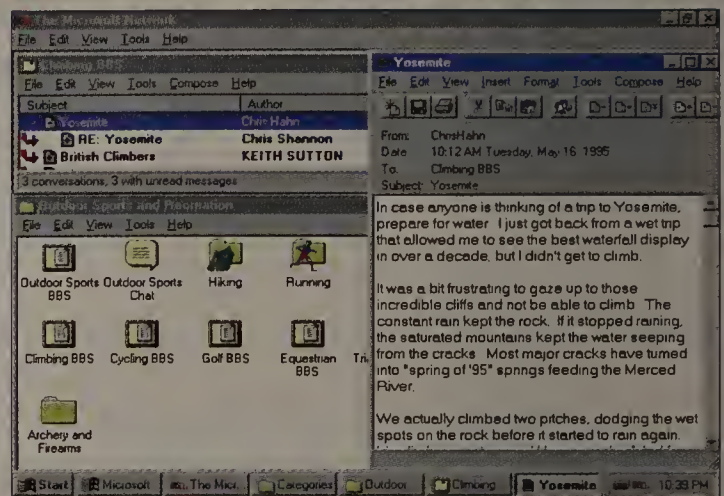
It's not yet clear how rich MSN's content will be, and the U.S. Justice Department could try to force Microsoft to unbundle MSN from Windows 95. Of course, even though the MSN client is free—like clients for Prodigy and America Online—you still have to sign up and pay for the service. MSN's price hasn't yet been announced, but it's expected to be aggressive.

What most differentiates MSN from any other service—and has provoked great controversy—is its tight integration into Windows 95. Never before has client software for an online service shipped in the same box as an operating system. MSN looks and feels like part of the desktop: Its forums are simply folders containing shortcuts to bul-

letin boards and chat and file areas. You can also convert online information into an icon, then drag the icon into a folder as you would a local file. This is an amazingly easy way to download or upload data. It's equally simple to add photos, artwork, sound, and even video clips to private or public MSN E-mail.

The whole thing looks great too, with snazzy icons and art. You can adorn your E-mail and forum messages with everything you'd expect from a good word processor: colors, fonts, bit-mapped graphics, and any OLE object. You can display multiple areas of the service on-screen at once and visit them simultaneously, cutting and pasting text and graphics. It's easy to find forums and services and almost impossible to get lost.

MSN displays graphics with photolike clarity, a plus for online shopping. File trans-



A rock-climbing discussion on MSN highlights the ability to open many windows at once.

mission and screen updates are fairly swift, although that may change once thousands of subscribers log on. Reports have circulated of huge delays in E-mail delivery on MSN, a problem we can only hope will be solved by the time the service goes commercial. For the time being, access to the network tops out at 14.4 kbps, but Microsoft plans to boost this to 28.8 kbps in the last quarter of 1995.

MSN's content will likely resemble that of services such as CompuServe and America Online. Microsoft has signed up about 50 partners, who expect to offer merchandise, information, entertainment, chat rooms, and customer support. Internet access, including Usenet newsgroups, is planned for late fall. Other possible features include Microsoft's own news service and financial and business databases.

The close link between Windows 95 and MSN cuts both ways. Users don't have to install separate software, and they can jump to services by clicking a shortcut. This alone could eliminate the barrier between your desktop and the information highway.

But the integration can also be confusing. Even experienced users may find it hard to tell what's on MSN and what's on their own PCs. Some windows may have only local files, while others may be racking up charges in a pricey online forum.

On balance, though, MSN's integration with the desktop is a breakthrough. What remains to be seen is how compelling—and how expensive—the service will be.

—Judy Heim

A Sampler of MSN Partners

- **American Greetings** Lets you create and send greeting cards online.
- **C-SPAN** Political news
- **Court TV** Online law center
- **Eastman Kodak Kodalux** Digital film bureau lets you preview photos online and decide which to print or enlarge.
- **Hardware vendors** Acer, Adaptec, AST, Dell, Epson, Gateway 2000, Hayes, Hewlett-Packard, Iomega, Microcom, Micron, NEC, Sharp, 3Com, Toshiba, Xircom
- **Home shopping** Interactive retailing from QVC and Home Shopping Network
- **Magazines and Newspapers** *Cooking Light*, *U.S. News & World Report*, *The New York Times* magazines, *Seattle Times*
- **NBC** Details still sketchy; likely to include chat groups about TV shows; additional news material. Bye-bye AOL and Prodigy.
- **Software vendors** Borland, Cheyenne, Claris, Computer Associates, Corel, Lotus, MapInfo, Shapeware, Symantec, Traveling Software
- **Starwave** Start-up owned by Paul Allen will supply sports information and online entertainment in partnership with ESPN.
- **Tele-Communications, Inc.** Owns 20 percent of MSN; will carry content on its @Home high-speed cable network.
- **Visa** Working with Microsoft on a credit card service; role in MSN is unclear.
- **Women's Wire** Online community about women and women's issues.

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Set¹ provides performance advancements of up to 30% over its predecessor in Windows application benchmarks!

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System Picture with Tower Case and 17" MAG Monitor.



Bundle MS-Compton's Interactive Encyclopedia, CardShop Plus Deluxe, EveryWhere USA Travel Guide, Mayo Clinic Family Health Book, Quicken SE and Main Street

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(PerfectOffice standard includes WordPerfect 6.1, Quattro Pro 6.0, InfoCentral, Presentations, Envoy and GroupWise)



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Quantex invites you to take a peek "under the hood" -- you'll find these systems packed with the market's hottest new technology. Like **Quad Speed CD-ROM** drives with 190ms Random Access time and a 256KB data buffer capacity for smoother video displays with no delays! We also provide your "on-ramp" to the Information Superhighway with our speedy **14,400 or 28,800 baud V.34 FAX/modems**, plus one month's free access to **America OnLine®**, **CompuServe®**, and **Prodigy®** on-line services. Don't worry, your eyes are not deceiving you. Quantex's high performance hardware gives you the ability to envision tomorrow's technology today.

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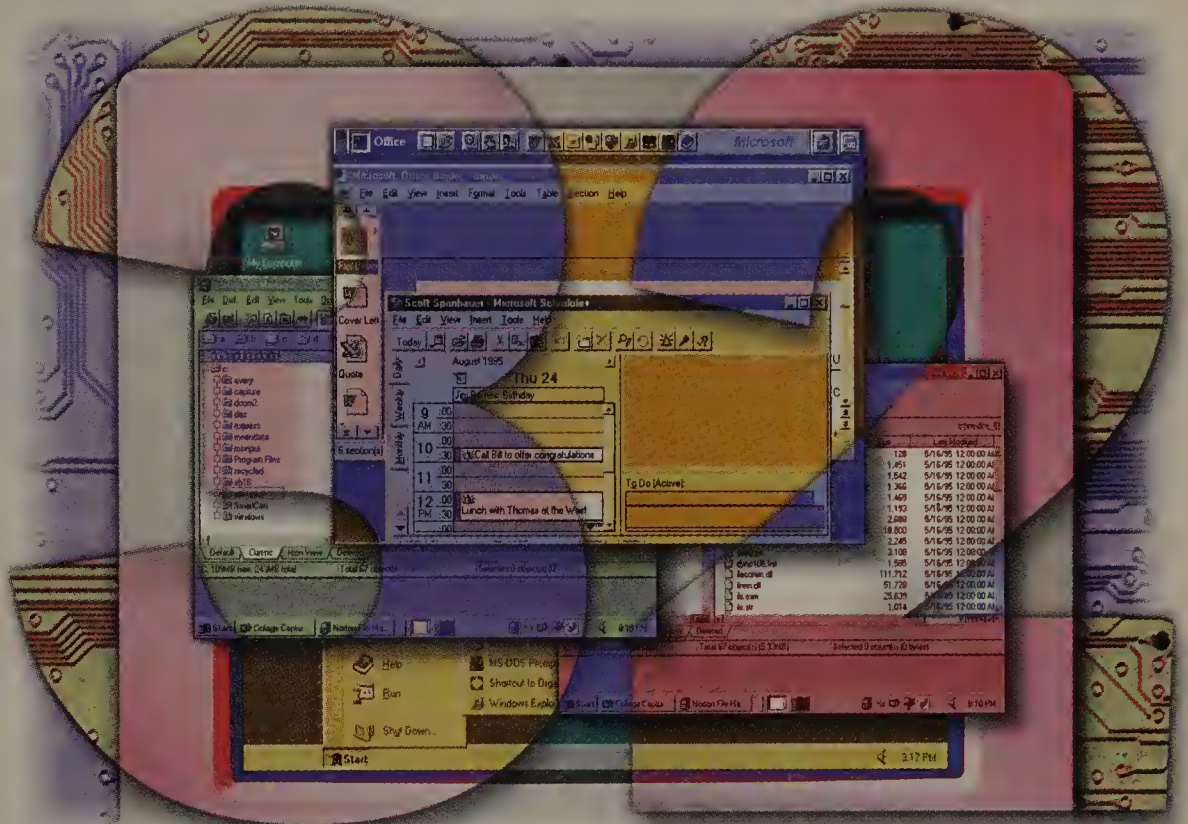
New Apps: The First Wave

After Microsoft's long-awaited baby arrives this August, software makers will shower the market with 32-bit applications. No wonder. Your 16-bit applications won't provide you with Windows 95's real benefits. And, under Windows 95, 32-bit apps in general will run faster than 16-bit apps.

Not surprisingly, Microsoft will be among the first to deliver Windows 95 applications, including its Office suite, expected to ship by September. Many of your other applications won't be ready as soon, and some, such as a few draw and presentation packages, were still works in progress at press time. Our chart gives you an idea of when they'll arrive in 32-bit form.

Be sure to check with vendors for the latest news, particularly on upgrade pricing.

—Laurianne McLaughlin and Harry McCracken



At a Glance Windows 95 Applications Roundup

	Company	Phone	Product	Estimated price	Upgrade price ¹	Estimated to ship by ²	What's new
Accounting/finance	DacEasy	800/322-3279	DacEasy Accounting ³	\$110	\$75	November	More fax and telephony capabilities.
	Meca Software	800/944-6322	Managing Your Money ³	\$40	\$30	1996	Easier to use, new online connections.
	Microsoft	800/944-6322	Microsoft Money	n/a	n/a	November	New Interface; new online banking partners.
Communications	CompuServe	800/848-8199	WinCIM	free	free	November	Windows 95 version.
	Delrina	800/268-6082	WinComm Pro 7.0	n/a	n/a	November	Visual Basic-compatible scripting; works with compressed files.
			WinFax Pro 7.0	n/a	n/a	November	Voice messaging, paging, and E-mail features.
Prodigy Services	800/776-3449	Prodigy (client)	free	free	n/a	Complete redesign of service.	
Database managers	Borland Int'l	800/336-6464	Paradox	n/a	n/a	December	Features to accelerate learning; new tools for apps development.
	Clarls	800/544-8554	FileMaker Pro 3.0	n/a	n/a	December	Windows 95 version.
	Lotus ⁴	800/343-5414	Approach ³	n/a	n/a	December	New workgroup features.
	Microsoft	800/426-9400	Access 7.0	n/a	n/a	September	Easier to use; works better with Office apps; more for developers.
Desktop publishing	Adobe	800/521-1976	PageMaker ³	\$895	\$149	October	HTML and PDF support for electronic publishing.
	Corel	800/772-6735	Ventura 6	n/a	n/a	December	Windows 95 version.
	Quark	800/788-7835	QuarkXPress 4.0	n/a	n/a	1996	Not available until 1996, but Interim release may precede it.
Desktop	Starfish	800/765-7839	Dashboard 95	\$50	n/a	August	Updated for Windows 95; adds drag and drop and OLE support.
	Symantec	800/441-7234	Norton Navigator	\$100	\$40	August	Windows 95 version.

continued on page 131

¹ Estimated prices only. Special conditions (competitive upgrades, cross-platform trade-ins, rebates, free upgrades for recent buyers) may apply. ² Assuming Windows 95 ships in late August. ³ Final product name or version number unavailable at press time. ⁴ At press time, IBM was planning to buy Lotus; Lotus product information could change.

Norton Maintains High Utility

You're ready to charge into Windows 95, but is your PC ready to follow? To find out, install the latest version of Symantec Norton Utilities. The new version of this venerable toolbox (we looked at the Preview Edition) runs a preinstallation checkup under Windows 3.1 to make sure your hardware is up to the task.

size, type, and last access date for unruly files (e.g., show me all files larger than 1MB that I have not opened in three months). The selected files can be deleted, moved, or archived.

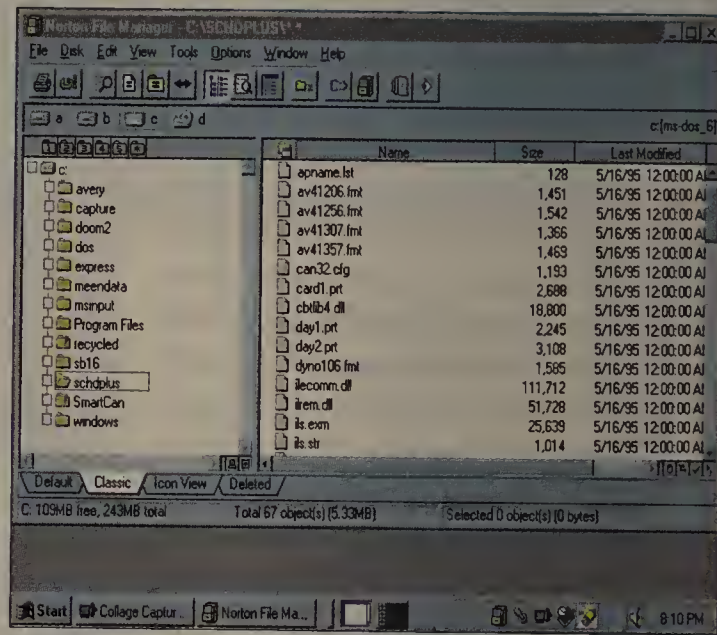
Another Symantec program, Norton Navigator, extends Windows 95's Explorer. Because Symantec bought Central Point Software (making it the biggest utility company this side of the Tennessee Valley Authority), you will feel at home with Navigator if

you've used recent versions of Norton Desktop or Central Point's PC Tools.

The beta release of Navigator we examined supports multiple desktops and drag-and-drop file management, making the Windows 95 interface easier to get around. An expanded Run shortcut lists the most recent applications and documents launched on your machine. The Taskbar provides a QuickLaunch area for documents and programs you use in all desktops.

Navigator lets Windows 3.1 apps recognize long file names. SmartFolders, which hold apps and documents related to specific jobs, update automatically when opened. And Internet tools let you create FTP sites within the Norton File Manager so you can upload and download files by dragging and dropping.

Like Space Wizard, Navigator's File Archive Wizard helps clear needed space on your hard disk. Its only drawback is a limit of one action per session. For example, to delete some files and archive others after an

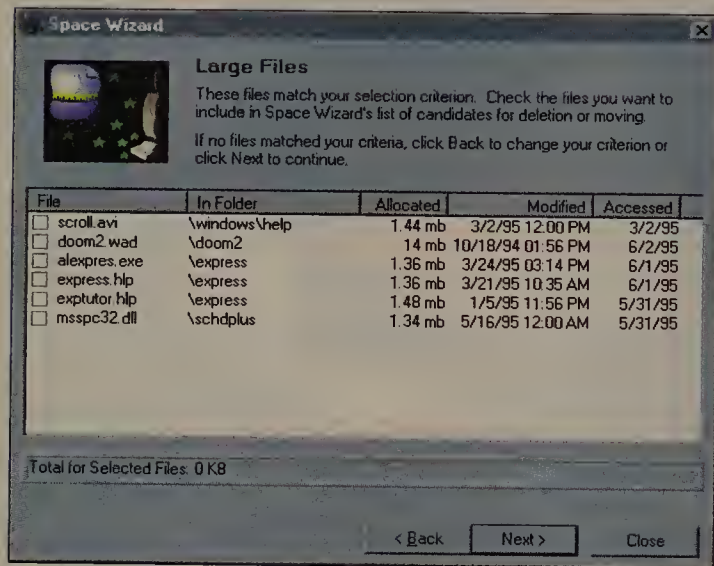


Navigator's Taskbar (bottom) lets you click to select different desktops or recently used programs and files.

Archive Wizard search, you must run the program twice. You can't delete files, then step back to the previous screen to select other files for archiving.

This Symantec duo makes the move to Windows 95 less frightening and your work there more organized. Of the two, Navigator extends the reach of Windows 95 further. But Norton Utilities remains an essential choice for detailed system maintenance.

—Peter Scisco

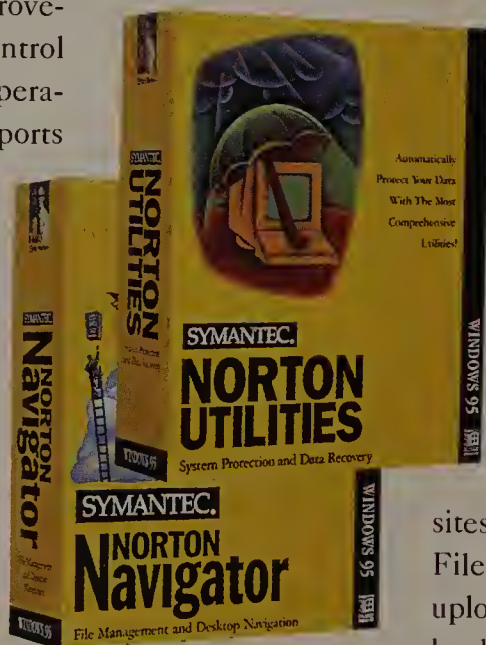


Space Wizard sounds like a George Lucas movie, but it's actually a smart way to minimize disk clutter.

Then the 32-bit Norton Utilities assigns Disk Doctor and System Doctor to residency in your PC. Disk Doctor scans regular or compressed drives for problems. If repair is needed, it offers diagnostic tools that go beyond the simple set in Windows 95's ScanDisk. Major improvements are more precise control over diagnostic and repair operations and more complete reports about these procedures.

System Doctor monitors computer activities and sounds an alarm when an assigned threshold is reached. For example, you can ask for a pop-up warning when your hard disk becomes too fragmented. System Doctor can prescribe the right corrective from Disk Doctor's little black bag.

These tools have some new companions. Best is Space Wizard, with its clear instructions for finding and removing duplicate and seldom-used files. It's easy to specify the



Office 95 Sets the Standard

One sobering reality awaits Windows 95 users: The operating system's biggest advantages are available only when running 32-bit applications. Microsoft has prodded developers to deliver native 32-bit applications as soon as the operating system ships, but nothing is more likely to motivate third parties than having to compete with Microsoft's own Office 95 upgrade—scheduled to ship about a month after Windows 95.

Like previous versions, Microsoft Office 95 Standard has a word processor (Word), a spreadsheet (Excel), and a presentation graphics program (PowerPoint). All three 32-bit apps carry the version number 7.0. The suite also now includes a 32-bit Schedule+ workgroup personal information man-



agement, formerly part of Windows for Workgroups. The Professional Edition (which adds the Access 7.0 database) will appear a month or two after the Standard Edition.

Office 95 adds utilities to Windows 95 that let you keep documents, appointments, and contacts organized. Earlier versions came with the innocuous Microsoft Office Manager, a floating toolbar of launching buttons; Office 95 offers an enhanced replacement called the Shortcut Bar, with multiple configurable toolbars. Like the Windows 95 Taskbar, it can be moved around the desktop and even hidden, so you can create custom menus of frequently used file and directory icons.

The Shortcut Bar solves a Windows 95 interface gap: Since one of the bar's default tools is the Desktop, you can get at documents and other icons living there without minimizing the window you're working in. The bar also lets you open the appointment, task, and contact dialog boxes in Schedule+.

Office applications take advantage of the improved Schedule+, which now has a contact manager. For instance, the standard Word toolbar lets you insert names and addresses from a Schedule+ contact database.

Another nifty new Office feature—the ability to post documents in public Ex-

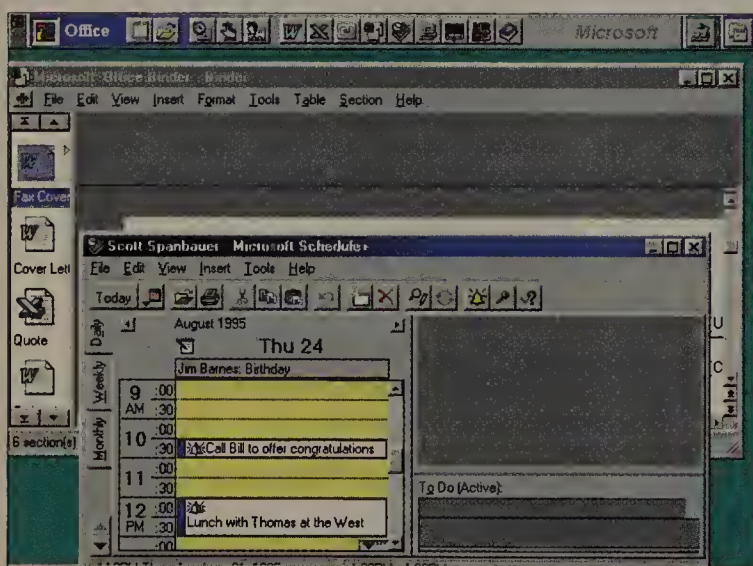
change folders—makes it easier for groups of networked users to share information. The Folder View lets you rearrange groups of documents by criteria such as whether they have been edited—a boon to workgroup document creation and management.

On-Screen Three-Ring

Windows 95's desktop still doesn't offer one of OS/2's neatest tricks: the ability to organize groups of documents into *workspaces*. But a new utility in Office, the Binder, lets you group collections of related documents—such as a résumé, cover letters, and a database of potential employers—into a single compound document. Opening the Binder lets you jump from one document to another without launching a new application or hunting through Explorer. Instead, you click the document icon, and the file opens. If it was created in another program, the menus and toolbars—following the conventions of OLE 2.0—change accordingly.

Office 95 programs support the Exchange mail client, letting you send files and messages, access Exchange folders, and attach routing slips without leaving your application. Mobile users can drag Binders to the Briefcase; if those documents contain Access data, your primary database can be updated with new values on a record-level basis. If you can't figure something out, even with the new Help engine, a click gets you to a help forum on the Microsoft Network.

—Scott Spanbauer



Office 95 adds a compound document container called the Binder and an improved version of Schedule+.

ager, formerly part of Windows for Workgroups. The Professional Edition (which adds the Access 7.0 database) will appear a month or two after the Standard Edition.

Icing 95's Cake

Each program improves incrementally on its predecessor; based on our beta tests of the new Word and Excel, we expect each to perform better than its 16-bit ancestor. The most notable improvement is support for Windows 95's features and interface, including long file names, right-mouse-button functions, multithreading, and document

Microsoft Office for Windows 95, Standard and Professional Editions

32-bit version of business software suite tailored to Windows 95's interface.

Key Features: Better multitasking versions of Word, Excel, PowerPoint, Access (Professional only), and Schedule+ • Support for compound documents through OLE

Pricing: Standard \$499, Professional \$599

Availability: September (Standard), October (Professional)

Microsoft, 800/426-9400

Reader service no. 772

Windows 95 Applications Roundup continued from page 131

	Company	Phone	Product	Estimated price	Upgrade price ¹	Estimated to ship by ²	What's new	n/a = information not available at press time
Suites, cont'd.	Novell	800/451-5151	PerfectOffice ³	\$659	\$299	December	Consolidated address directories; easier to use, better networking. Windows 95 version.	
			PerfectOffice	\$859	\$399	December		
			Professional ³					
Tutorials	CRT Multimedia	800/457-1246	EasyTutor	\$39	—	August	CD tutorial about Win 95 runs under Windows 3.1 and 95.	
	Individual	800/822-3522	Professor Windows	\$30	—	August	CD tutorial with interactive lesson.	
Utilities	Arcada	800/327-2232	Arcada Backup	\$99	n/a	August	Adds multitasking, plus wizard technology for ease of use.	
	Helix	800/451-0551	Hurricane	\$80	free	September	Optimized for Windows 95.	
	Inso	800/333-1395	Quick View Plus	\$45	—	August	Windows 95 application.	
	McAfee	800/332-9966	VirusScan 95	\$65	n/a	September	Windows 95 version.	
	MicroHelp	800/777-3322	Uninstaller 3	\$45	\$30	October	Windows 95 version.	
	Nico Mak	800/242-4775	WinZip ³	\$29	n/a	August	Revised to work with 32-bit apps and Windows 95.	
	Quarterdeck	800/354-2834	CleanSweep ³	\$60	\$30	November	Uninstalls programs and files from Windows 95 and Windows 3.1 apps.	
			QEMM ³	\$99	\$30	November	Additional memory management.	
	Symantec	800/441-7234	Norton Utilities	\$120	\$60	August	Prepares PCs for Windows 95 installation, ensures data security.	
Norton AntiVirus			\$80	\$30	August	Windows 95 virus protection.		
Vertisoft	800/466-5875	Remove-It ³	\$39	—	September	Uninstalls programs and files from Windows 95 apps.		
Word processing	Lotus ⁴	800/343-5414	Word Pro ³	n/a	n/a	December	Similar to recent Win 3.1 Word Pro with group editing but adds more graphics tools.	
	Microsoft	800/426-9400	Word 7.0	n/a	n/a	September	New tools make common tasks easier.	
	Novell	800/451-5151	WordPerfect ³	n/a	n/a	December	Windows 95 version.	

¹ Estimated prices only. Special conditions (competitive upgrades, cross-platform trade-ins, rebates, free upgrades for recent buyers) may apply. ² Assuming Windows 95 ships in late August. ³ Final product name or version number unavailable at press time. ⁴ At press time, IBM was planning to buy Lotus; Lotus product information could change.

At press time, the following companies could not provide details or declined comment about their upcoming Windows 95 applications: 4Home Productions, America Online, Diagsoft, Great Plains Software, IBM, Intuit, PC Kwik, Peachtree Software, Primavera, Stac Electronics, Symantec (Contact Management Division), Traveling Software.

The Logo Says It All

It may not carry the weight of the *Good Housekeeping* seal, but the "Designed for Windows 95" logo campaign is Microsoft's way of identifying products able to make the most of Windows 95. The logo will appear on wares from a range of PC hardware and software companies. "It's important to differentiate true Windows 95 products from older ones, or ones that only went halfway," says Deborah Epstein-Celis, a Microsoft Windows 95 product manager.

To qualify for the logo, software must meet a long list of prerequisites. The most significant: It must be 32-bit to take advantage of Windows 95's preemptive multitasking, better memory management, and greater reliability. Programs also must support long file names and provide an uninstall

utility, and most software must offer at least basic OLE 2.0 functionality. Microsoft also encourages vendors to implement other Windows 95 features, such as context-sensitive menus that pop up when you right-click on an icon.

For PCs and other hardware, the logo campaign focuses on ensuring that devices take advantage of Plug and Play. For instance, even a 386 PC with 4MB of RAM could use the logo if it had a Plug and Play BIOS, identified its ports with icons, and met a few other requirements.

To verify that products meet logo requirements, Microsoft insists they undergo testing. Microsoft's own compatibility lab performs hardware tests; software evaluations

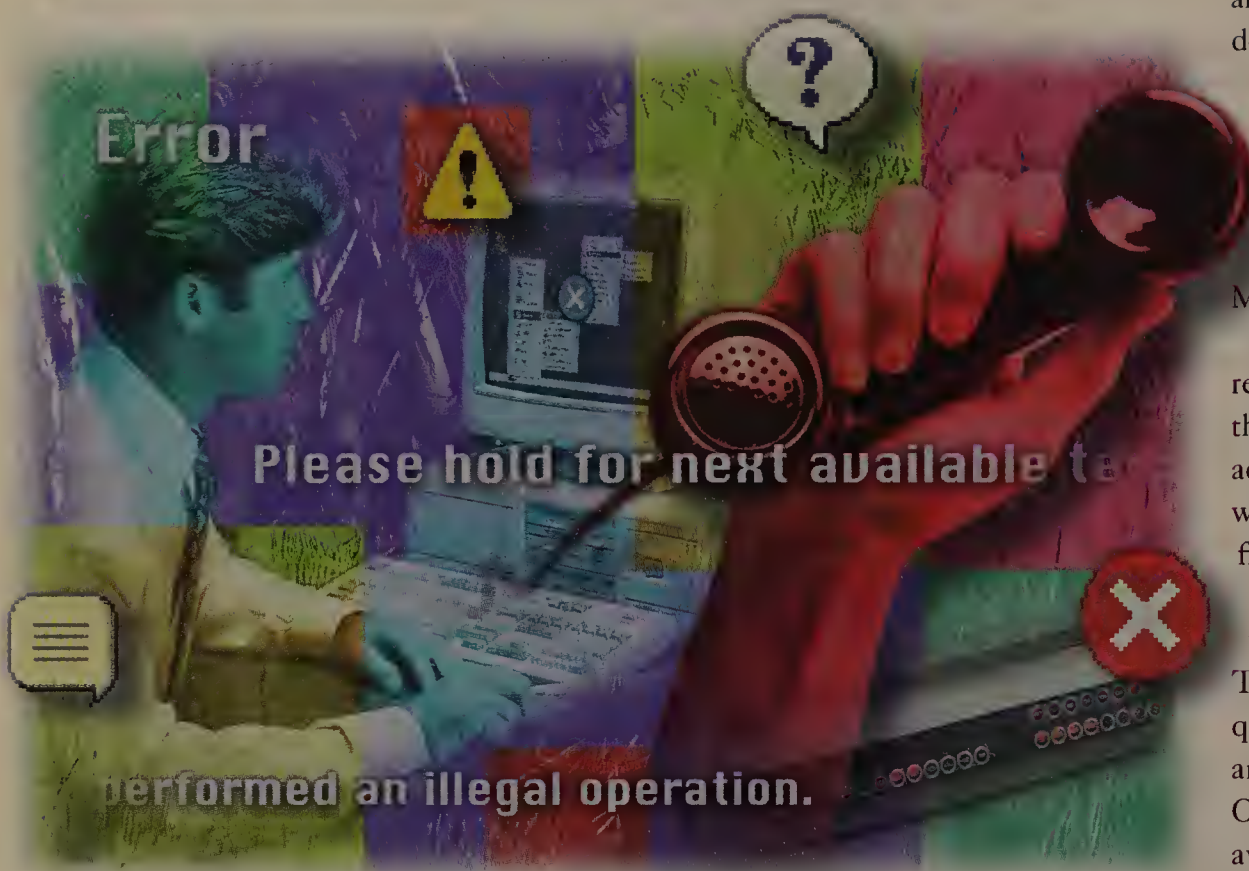
are done by an independent firm to head off questions about bias. Vendors pay from \$600 to several thousand dollars for the tests.



Buying products that bear the logo ensures you won't get an aging Windows 3.1 app that happens to work under Windows 95. But the point may be moot in the long run, says Jeffrey Silverstein, editor of *Software Industry Bulletin* in Stamford, Connecticut. "All the major developers are going to make sure that their products are 32-bit and Windows 95 compatible anyhow," he says. "Everyone wants to jump on that bandwagon."

—Harry McCracken

1-800-HELP!!!



Installing a new operating system is scary: If all goes well, you could be happy ever after. But if you run into trouble, it'll be your sweaty palms clutching the phone, and the last thing you want to hear is: "Thank you for calling Microsoft. All our technicians are helping other desperate callers. Please hold."

The hyped-up Windows 95 launch could translate into a lot of people picking up the phone at once to talk to tech support. "We are talking about a volume of calls that has never been seen in this industry," says Bob Johnson, director of software services for Dataquest in Framingham, Massachusetts. "Unless [support providers] are really revved up, we are talking about a possible crisis."

Microsoft, aware of the danger, has taken a bold step to handle the crush: It has hired five outside companies to help it survive the launch. When you dial Windows 95 tech support, your call could be answered by a Microsoft employee—or by somebody working for Digital, Keane, Stream (formerly Corporate Software), Softmart, or Unisys.

Hiring outside support help is not new in the software industry; what is new is how openly Microsoft is promoting its five part-

ners. "It's a strategic move to broaden the options out there," says Deborah Willingham, vice president of support at Microsoft.

When you buy Windows 95 at retail (versus preinstalled on a computer), it comes with 90 days of free support. (The clock starts ticking the first time you call.) During these 90 days, Microsoft will answer questions about Windows 95 and its compatibility with third-party applications, plus hardware questions relating to Plug and Play. (For instance, Microsoft would help with a Windows printing problem but not necessarily with setting DIP switches on a modem.)

If you must speak to a person, call during off hours. Free help is available 6 a.m. to 6 p.m., Pacific time, at 206/637-7098. Avoid calling first thing in the morning or midday. If you can't get through, it means Microsoft decided hold times are too long and turned on the busy signal. If you are desperate, you can call after hours (800/936-5700), but it will cost you \$35 per incident.

When 90 days are up, you can buy additional support from Microsoft *or* any of the five outside firms that helped with the launch. Microsoft plans to charge \$35 per incident or \$1.95 per minute for this kind of support; an annual plan costs \$395 and includes 35 incidents. Third-party providers haven't disclosed their charges yet.

Outside support providers have one big advantage: If you use apps from multiple software companies, a third party will support them all for one price. Microsoft will support only its own products.

Microsoft has over 1600 support engineers ready to answer the phones. But despite these extraordinary measures, Willingham admits, the launch may be tough. "There will be times when people will not be satisfied with the wait times," she says.

Where else can you turn? If you think your question is common, call the Fast-Tips line (800/936-4200) for answers to frequently asked questions. You can have the answers faxed to you or just listen to them. Or go online. Microsoft technical support is available on the Internet ([ftp.microsoft.com](ftp://ftp.microsoft.com)), World Wide Web (<http://www.microsoft.com>), Gopher (<gopher.microsoft.com>), CompuServe ([go microsoft](go.microsoft)), America Online (<microsoft>), and GENie (<microsoft>). And some of the best support often comes from other users.

Of course, if you plan to buy a new computer anyway, you can get Windows 95 preloaded, with no configuration hassles. But this route has one danger: If you buy Windows 95 from a hardware manufacturer, you

Busy Signal? Online Sources of Help

E-Mail list

win95-l To subscribe, send a message containing **subscribe win95-l firstname lastname** to win95-l@peach.ease.lsoft.com. Be prepared to get up to 100 messages a day.

Newsgroup

alt.os.windows95.crash.crash.crash More useful information than the name implies.

World Wide Web pages

<http://darwin.biology.queensu.ca:80/~jonesp/> The Windows 95 page gets high marks.

<http://www.access.digex.net/~rfowler/software.html> 32-bit freeware/shareware. Still under construction.

<http://www.whidbey.net/~mdixon/win40001.htm> A Q&A page.

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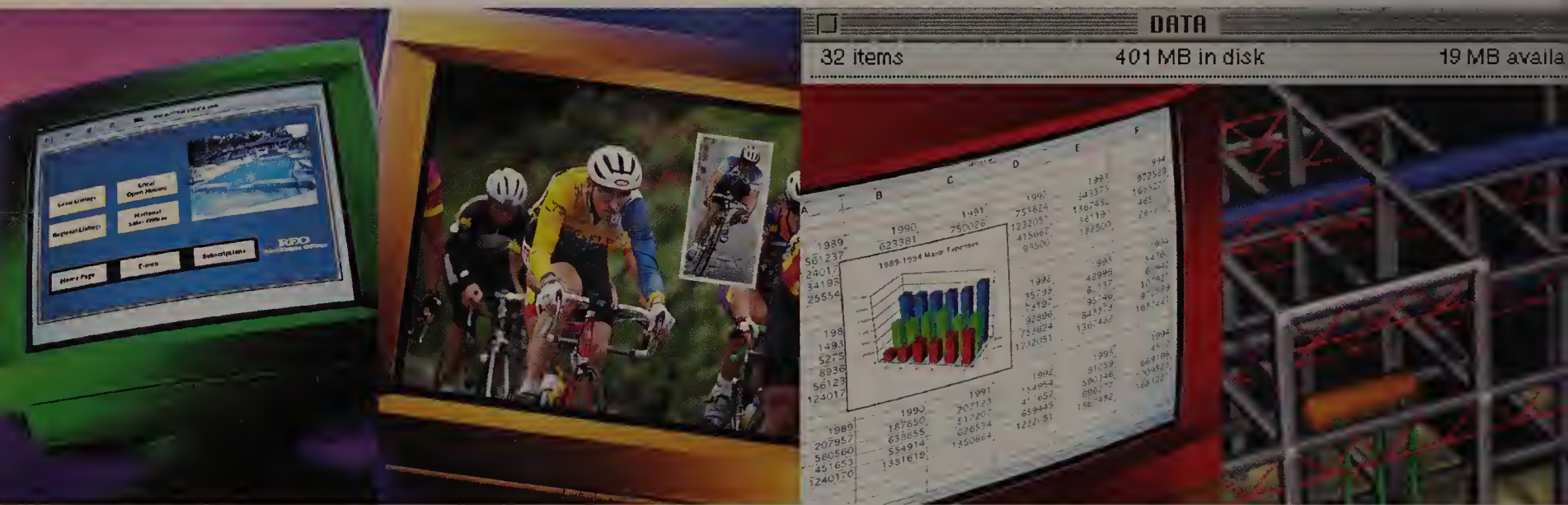


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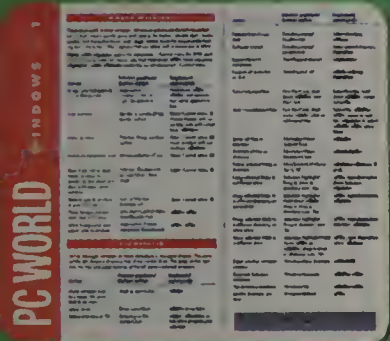


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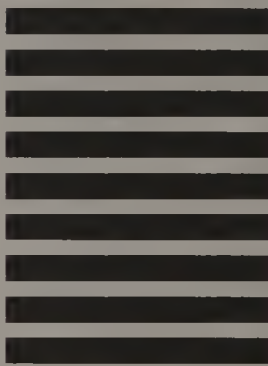
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Deborah Willingham, Microsoft vice president of support, says the company has "bought up" all available tech support help.

forgo *any* free Microsoft phone

support (though you can still use online venues and FastTips).

System vendors have widely varying support policies—and abilities. At press time, for example, Compaq had not decided how

much free support customers would get on preinstalled copies of Windows 95. Gateway 2000 plans a separate toll-free support line just for Windows 95.

If you plan to buy a new computer with Windows 95 preinstalled, ask a lot of questions first: How long does free support last, and how much does paid support cost? What kinds

of inquiries will the company answer? How much Windows 95 training has tech support received?

Will you get the original documentation or the hardware manufacturer's version?

Interestingly, the effect that Windows 95 has on technical support could be more far-reaching than just increasing busy signals.

Dataquest's Johnson argues that in the long term, technical support costs may increase. With Windows 95 managing all your peripherals, Johnson says, Plug and Play will mean more calls to software vendors when hardware doesn't work. And those calls will take longer than typical software calls. Software providers will respond by raising the price of support. "I estimate that we will see per-question fees increase by better than 25 percent," says Johnson.

On the other hand, hardware vendors are looking forward to Windows 95 and the effect it will have on their support load. "A large number of our calls are about multimedia," says Gateway project manager David Reiss. "With Windows 95 you just turn it on and it configures. There are no IRQs, no jumpers. There will be a learning curve for the customer, but once that curve is over, Windows 95 will be a bonanza for us."

—Christina Wood

How to Avoid Technical Support Altogether

- Your 286 won't even run Windows 95. Head to the store for a real computer, preferably a 486-66 or better. Make sure it has at least 8MB of RAM—16MB for top performance—Plug and Play BIOS, and a quad-speed CD-ROM drive.
- Your 386 will run Windows 95 (as long as it has at least 4MB of RAM), but so slowly you'll long for the days of WordStar and 1-2-3 for DOS. Consider a processor and RAM upgrade. A CD-ROM drive will make installation vastly easier.
- Before you do anything else, back up your local drive(s). Right now.
- The biggest unknown in upgrading to Windows 95 is its support for your hardware. Minimize problems by yanking aged peripherals. Microsoft will provide a utility to check out your system's readiness. Other tools: Win'95 Advisor, \$40, TouchStone Software, 800/531-0450, **Reader service no. 773**; and Norton Utilities for Windows 95 (system tune-up module), \$120, Symantec, 800/441-7234, **Reader service no. 774**.
- Should you replace your existing Windows setup with Windows 95 or keep both versions? If you overwrite, Windows 95 preserves your old Program Manager groups and win.ini settings. But if a crucial 16-bit app doesn't work, you can't switch to Windows 3.1 to run it. If you retain Windows 3.1 and put Windows 95 in a different directory, you can dual-boot them until you know everything checks out. However, you may have to reinstall old Windows programs in the new Windows 95 directory and add them to the Start menu manually. And you'll have to manage both environments separately as long as they coexist.
- Decide how much of Windows 95 to install. You have three options: Typical, Portable, and Compact, which use roughly 35MB, 33MB, and 30MB of disk space, respectively, when installed from scratch. If you want the works, a full installation sets you back 65MB. Custom installation presents you with a number of options, including one you should definitely skip: installing the old Windows 3.1 interface instead of Windows 95's.
- Success! Windows 95 is installed, and you're up and running. Now you may want to start upgrading to 32-bit Windows 95 applications. And you'll need to customize your setup, including removing real-mode drivers and TSRs from autoexec.bat and config.sys. If you can, eliminate these entirely; Windows 95 and 32-bit applications don't need them.
- The Windows 3.x apps most likely not to run on Windows 95 are virus programs and file management or interface enhancement utilities. For a list of roughly 200 older programs that don't run on Windows 95, call Microsoft at 800/426-9400, or consult the WinNews forums on AOL, CompuServe, Prodigy, Genie, or the Microsoft Network; or go to www.microsoft.com on the Web.
- !@%\$#! You hate Windows 95! So how do you uninstall it? Microsoft says it will supply a utility with the shipping version to let you remove the operating system and restore Windows 3.1.

—Scott Spanbauer

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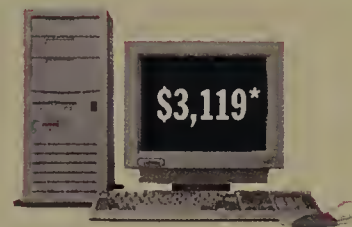
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Cache Internal	8KB	16KB	16KB
Cache External	256KB (optional)	256KB	256KB
Local Bus Graphics	PCI	PCI	PCI
Video Memory/Max.	1MB/2MB	1MB/2MB	2MB/4MB
Compaq 150 Color Monitor	Yes	Yes	Yes
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Expansion Slots (Total)	3	4	5
Drive Bays (Total)	3	4	5
Ports: Serial/Parallel	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)
Security Features	Yes	Yes	Yes
101-Key Keyboard, Mouse	Yes	Yes	Yes
Software Preinstalled	MS-DOS® 6, MS-Windows® 3.1	MS-DOS 6, MS-Windows 3.1	MS-DOS 6, MS-Windows 3.1
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By Robert L. Lindstrom

o see a roomful of businesspeople fidgeting like a bunch of five-year-olds, try giving a traditional presentation. It's no wonder that attention spans are shorter than ever: In a world of music videos and television commercials filled with alluring imagery and fast-paced camera work, a few pie charts projected on a screen won't captivate many people.

Dress up those same pie charts with animation, video, music, and sound effects, though, and you stand a good chance of grabbing your audience's attention—and getting your message across. Besides being entertaining, multimedia helps you convey ideas more quickly than old-fashioned presentations ever could. If you're announcing a sales figure that's worth celebrating, for example, you can drive the point home by adding, say, a sound track full of stirring music and applause to your show.

Once the domain of high-end, ex-



Want to add a little razzle-dazzle to your presentations? It's easier than you think.

We compare three new-wave packages and see how five veteran contenders stack up.

pensive applications aimed at communications professionals, multimedia has worked its way into nearly every presentation package on the market, and you don't need the skills or the bankroll of a Steven Spielberg to give your shows a glitzy Hollywood touch. But it's important to understand that there are really two distinct classes of presentation products: packages that have been built for multimedia from the ground up, and programs of long-standing popularity that have been retrofitted for it.

The first category is a new breed of program—including Macromedia's

Multimedia *Is the* Message

Action, Gold Disk's Astound, and Midisoft's Super Show & Tell (SST)—that lets you import multimedia elements such as video, animation, and sound, in much the same way that conventional presentation programs allow you to bring in still images and text. These products also add multimedia touches to standard presentation features, such as the ability of Action and Astound to create charts that fly onto the screen one piece at a time.

The new-wave packages compete against veteran contenders such as Lotus's Freelance Graphics, Software Publishing's Harvard Graphics, and Microsoft's PowerPoint. As these older packages have evolved, their developers have worked hard to make creating presentations easier and more effective. They now incorporate features that assist presenters with content development, artistic design, and workgroup collaboration.

At the same time, though, these old-line programs have so far made only modest efforts to embrace multimedia. They rely mostly on OLE (Object Linking and Embedding) to pass control over to external multimedia applets. You can import

and play media files with OLE, but you have very little control over the display and timing of the objects. OLE also makes strenuous demands on your system resources, which can lead to memory conflicts and synchronization problems.

One reason conventional programs have been slow to adopt multimedia is that most are sold primarily as parts of suites: Freelance Graphics comes with Lotus SmartSuite, PowerPoint with Microsoft Office, and Presentations with Novell PerfectOffice. Since purchasers who acquire presentation software in a suite are likely to use it only from time to time, the developers have emphasized making these programs simple to learn (and relearn), rather than adding cutting-edge features such as multimedia.

Indeed, we found that on the whole, the conventional programs still deliver better online help, ready-made templates, and other hand-holding devices than their multimedia-focused competitors. Such assistance may prove especially important if you use your presentation program only occasionally.

It's also a mistake to discount such conventional features as outlining, which lets you work with your presentation's topics in a word processor-like screen that makes it possible to concentrate on your show's overall structure. You may also want the ability

Five Tips for Show-Stopping

1 Borrow artistic expertise. While you don't need to be an artist to create appealing multimedia presentations, you may end up with an amateurish-looking production if you're not careful. Use the templates and clip art that most presentation packages offer, and consider buying additional clip art if you've got special needs.

to print out speaker notes (notations you consult as you conduct a show) and handouts (printed summaries for the audience).

Decisions, Decisions

For all the strengths of the conventional packages we evaluated, the multimedia specialists—especially Astound, our Best Buy among them—should be at the top of your shopping list if you need multimedia features that go beyond the basics. If, on the other hand, you want a package that makes creating simple presentations as hassle-free as possible, the conventional packages still deserve consideration.

Harvard Graphics is our Best Buy among the old-line programs, but if you use one of the big three office suites, test-drive the presentation package in it before buying a stand-alone product. PowerPoint, Presentations, and Freelance are all pleasing general-purpose choices, and fell only slightly behind Harvard Graphics in our tests.

The ultimate presentation software package—one that blends simplicity and sophistication and that handles traditional and multimedia features with equal panache—has yet to be invented. Creating an effective presentation will always take time, effort, and careful thinking, but the best packages here can help you do it in style.

All packages reviewed here were evaluated in their Windows versions.

Robert L. Lindstrom is the author of The Business Week Guide to Multimedia Business Presentations (Osborne/McGraw-Hill, 1994; 800/227-0900) and editor of the newsletter Multimedia Presentations Report.

For more information about all products in this article, circle reader service no. 906.

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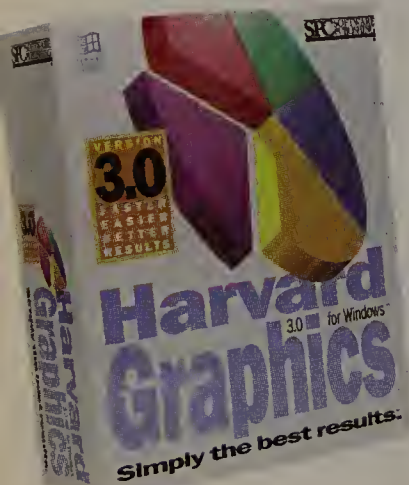
Best Buys

None of the presentation products we evaluated is equally adept at handling

both multimedia and conventional shows. For this reason, we've chosen two products as Best Buys—one for multimedia shows, and another for traditional ones.

Of all the packages, Gold Disk's Astound 2.0 does by far the best job of blending old-fashioned tools with potent multimedia features. Multimedia mavens will like its sophisticated interactivity options and other advanced features; the fact that it comes with Astound Studio—a fine suite of multimedia editing tools—closes the door on other multimedia contenders.

Harvard Graphics 3.0 is our choice as the best all-around conventional presentation package. From its crisp, appealing user interface to the easy-but-powerful drawing features of Harvard F/X, the package delivers with plenty of power and a low learning curve. Its one weak spot—middling support for multimedia elements like animation and video—is shared by all the traditional packages we tested. Otherwise, it does nearly everything well.



Conventional Presentations:
SPC Harvard Graphics 3.0



Multimedia Presentations:
Gold Disk Astound 2.0 with
Astound Studio

Multimedia Presentations

2 Know your player program. Virtually every presentation package provides a player program you can use to play your screen shows on PCs that don't have the full package installed. But since these players don't always support all the features of the presentation package itself, make sure you know what they can and can't do.

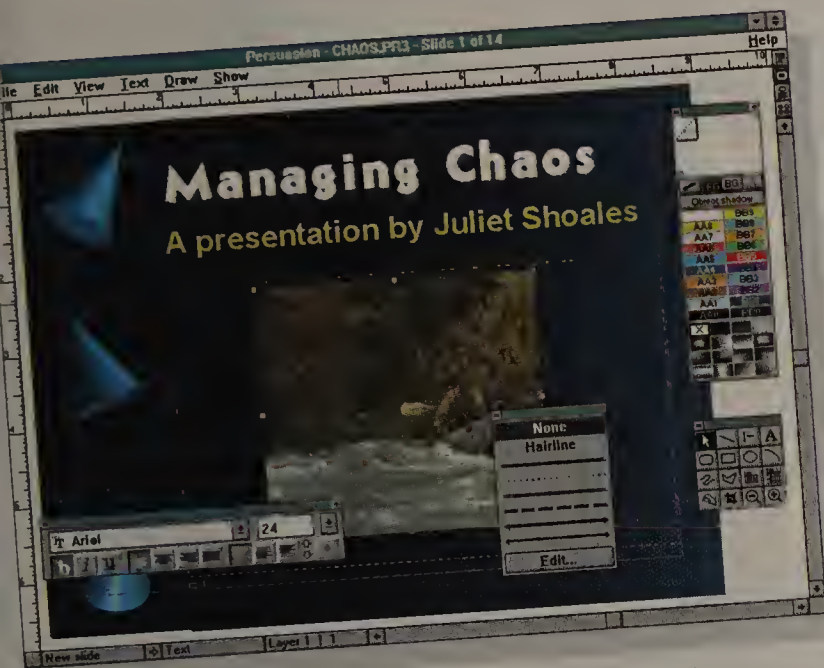
3 Avoid sensory overload. It's tempting to cram as much motion and sound as you can into your shows. But they'll be more effective if you include media clips only when they make a point that can't be made through conventional means alone.

4 Bypass sluggish CD-ROMs. Keep in mind that CD-ROMs—even quad-speed models—aren't as fast as hard disks. To avoid jerky playback of media clips, copy them

from the CD to the PC's hard drive before adding them to your show.

5 Tailor multimedia to your PC. If your PC is showing its age, design your shows to reduce hardware needs. Most animation formats play fairly briskly even on older systems that can't handle video, and if you're tight on disk space, use MIDI music files rather than .wav ones—they're far more compact.

—Harry McCracken



PERSUASION OFFERS desktop publishing-like graphic controls, including floating palettes that allow you to specify fonts, lines, and colors.

clips without using OLE. This lets videos run very smoothly and allows you to create shows for playback on Macs as well as PCs.

Persuasion handles sound well in comparison to other traditional packages. For example, you can choose to

play only part of a sound clip and to play a music file across multiple slides.

With a little work, you can employ the program's sophisticated layering capabilities to add animation effects to charts and tables. And Persuasion's interactivity tools let you program on-screen objects to jump to another slide, presentation, or app when clicked.

Persuasion also offers heavy-duty output options, including advanced tools such as color-management controls. While most users won't need these features, they make the package worth considering if you want your presentations to be as visually perfect as possible. The vendor-estimated street price dropped to \$295 at press time. *Adobe Systems, 800/521-1976 Reader service no. 731*

ASTOUND COMES WITH a complete set of multimedia creation tools, including the Astound Actor animation program.

Gold Disk Astound 2.0

Multimedia A Conventional A-

PROS: Easiest-to-use multimedia package, outstanding templates, full-featured tools for creating multimedia elements

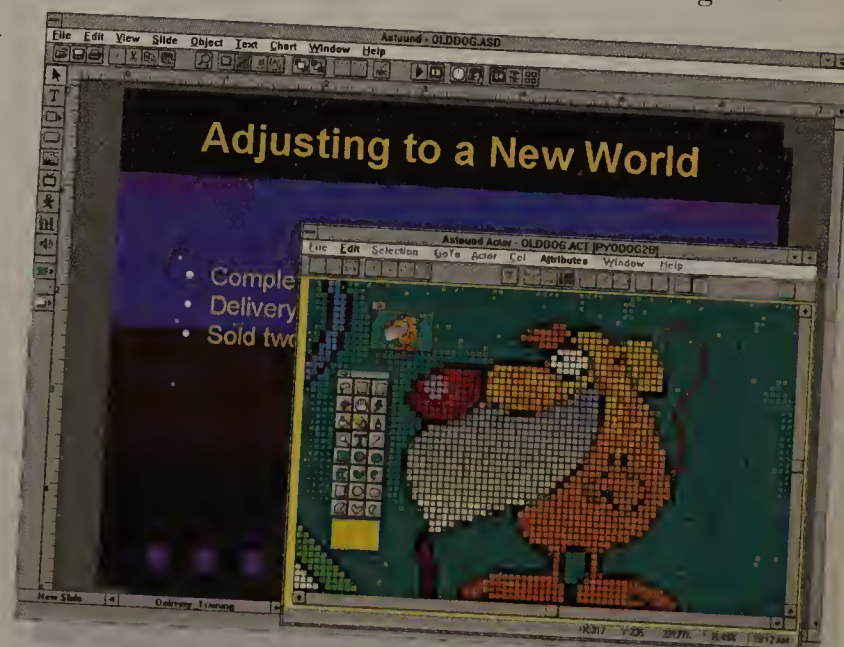
CONS: Minimal design guidance, no online tutorial, inconsistent clip media quality



Astound 2.0 nearly grabs the brass ring of presentation software, by combining the strengths of conventional slide-show packages—including automated templates, slide masters, and outlining—with all the tools you need to add full-blooded multimedia to your shows. While it's not quite as easy to use as the best conventional packages, Gold Disk's Astound easily merits a Best Buy recommendation, especially at its vendor-estimated street price of \$200.

Like conventional presentation packages, Astound adheres more or less to a slide-show metaphor. But it also provides timeline editing, which lets you precisely synchronize sound clips, animations, and other multimedia objects within each slide.

Astound's tools for creating three-



Adobe Persuasion 3.0

Multimedia C+ Conventional B+

PROS: Professional-strength layout and design tools, better-than-average multimedia, cross-platform capability

CONS: No OLE 2.0 support, noninteractive tutorial, limited selection of templates

The Macintosh version of Adobe Persuasion has long been a favorite of graphics professionals. As it has evolved and added a Windows version, Persuasion has become easier to use for businesspeople who create presentations only occasionally.

Even so, Persuasion continues to be most useful for full-time artists who create presentations for others to give, and for those who need precision layout features such as automatic kerning and multiple rulers. It offers strong graphics importing and editing features, and its charting module is both thorough and loaded with options.

On the multimedia side, the features that set Persuasion apart from its conventional competitors are its inclusion of QuickTime for Windows and its ability to import video

dimensional, animated charts go far beyond those of the competition. You can assign individual effects, timing, and speeds to the elements within a chart, allowing you to emphasize particular data. You can also rotate charts in 3-D space to any perspective.

The package's handy Headstart preformatted presentations help you rapidly build shows that address such typical topics as financial reports and dealing with a crisis, or you can choose one of Astound's templates and simply plug in your own multimedia elements. The slide-show optimizer function can then analyze your presentation, suggest ways to improve its performance, and make the changes for you automatically.

One of Astound's biggest advantages is that it comes bundled with Astound Studio, a suite of applications that provides all the tools you need to create, edit, and manage graphics, animation, video, and audio. None of these utilities match the best stand-alone products in their class, but they're all solid and useful and go far beyond anything offered by other presentation packages.

Astound could still learn some tricks from the electronic help offered with the best conventional packages. Understanding how to use multimedia effectively is a bigger challenge than learning to create an ordinary slide show, but Astound doesn't provide an online tutorial or any special advice on adding sound and motion to your presentation. Its CD-ROM of multimedia elements is also a bit erratic in quality.

Despite these relatively minor flaws, Astound 2.0 sets a new standard for multimedia presentation packages. Gold Disk has given developers of both traditional and multimedia programs something to shoot for in their next releases. *Gold Disk*, 800/982-9888 Reader service no. 732

Lotus Freelance Graphics 2.1

Multimedia **C** Conventional **B+**

PROS: In-depth tutorial and other helpful features for beginners, workgroup and E-mail functions, sound clips

CONS: Modest multimedia capabilities, no OLE 2.0 support

Lotus Freelance Graphics 2.1 pioneered many of the usability features, such as automated templates, that nearly all its competitors have since adopted. While the package—which most users get as part of the Lotus SmartSuite—no longer holds a huge edge in ease of use, it is still a very accessible product, with an impressive range of conventional presentation tools, including more than 60 SmartMaster templates. And the program's interactive tutorial is entertaining. However, as with the other traditional packages reviewed, its multimedia features are so-so at best.

The package gives you a wide selection of chart types and lets you see a preview of how changes will affect a chart's look before you commit to them. You also get an appealing set of transition effects, including clever, animated theater curtains and window shades that open and close to reveal and hide the contents of your slides. But we found that the transitions, which have no timing controls, occurred somewhat too quickly on our test system.

Although it's not a full-fledged multimedia presentation product, Freelance has more built-in multimedia capability than do PowerPoint and Presentations. The program includes two simple applets in the toolbar that you can use to launch sound and video through OLE. Like other OLE-reliant programs, Freelance doesn't give you much control over playback, but an option allows you to set the

LOTUS MEDIA MANAGER is a simple playback utility that gives Freelance most of its multimedia capabilities.

number of times a file plays or loops when triggered, and you can turn any on-screen object into an interactive button that jumps to another slide, launches an outside application, or plays a multimedia object.

Freelance (\$330 on the street) gives you just about everything you need to easily create conventional slide shows. But if you need high-powered multimedia capabilities, think about moving to a package designed specifically for the role, such as Astound. *Lotus Development Corp.*, 800/343-5414 Reader service no. 733

USING ACTION'S POWERFUL TIMELINE EDITOR, you can precisely synchronize video, sound, and other multimedia elements.



Macromedia Action 3.0

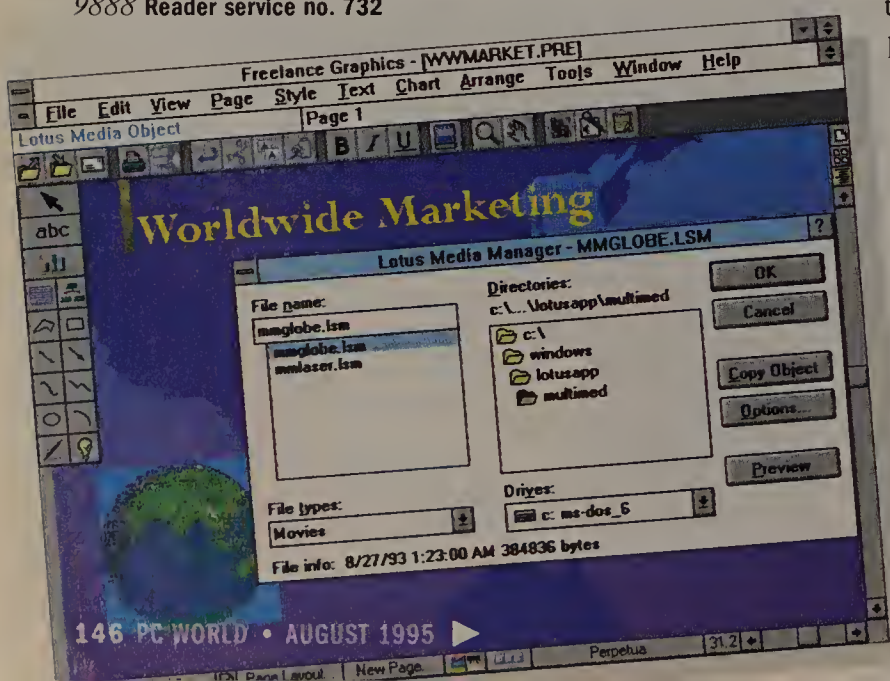
Multimedia **A-** Conventional **C**

PROS: Precise timing controls, built-in animation tools, high-quality CD-ROM of clip art and multimedia files

CONS: Limited printing and multimedia creation features

Macromedia Action was born to do multimedia. The program's kinship with Director, Macromedia's high-end authoring tool, is apparent in the ease with which it lets you integrate text, graphics, sound, and motion.

Action dispenses with the slide-show metaphor of most programs. A presentation can be made up of a single sequence with multiple elements, or you can build interactive shows that incorporate separate scenes, then use the program's interactivity features to let users jump from one scene to another when they press a key or click an on-screen button. By sliding colored bars around in Action's timeline view, you can specify ex-



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actly when the elements in each scene appear, and how long they stay on screen.

Action's impressive animation features let you create animated charts, cause objects to travel along a multipoint paths, and apply animated effects to any on-screen element. However, the package lacks Astound's powerful tools for creating animations, video clips, and still images from scratch.

Action 3.0 still can't perform automatic gray-scaling to optimize black-and-white printed pages or print out speaker notes, but it does have an outliner and a spelling checker. The CD-ROM edition also has excellent ready-to-use multimedia elements.

For multimedia, Action offers much more than any of the conventional programs we tested. But Gold Disk's Astound matches nearly all of Action's abilities, while adding comprehensive traditional features and multimedia creation tools that make that product a far better value. Action is street-priced at \$129, \$229 with the CD-ROM. *Macromedia, Inc.*, 800/288-4797 Reader service no. 734

Microsoft PowerPoint 4.0

Multimedia C- Conventional A-

PROS: Easy to use, strong online assistance for beginners, rehearsal feature, good text handling

CONS: No built-in multimedia support, modest charting and drawing tools, uninspired template designs and transitions

Today's presentation packages have made great strides in usability—and Microsoft's PowerPoint 4.0 may be the most inviting of them all. (PowerPoint is usually bought as part of Microsoft Office.) From its enjoyable tutorial to its preformatted presentations and context-sensitive help, the program excels at getting first-time users up and running quickly. There's one big catch, though: Its built-in multimedia features are the skimpiest of any package we evaluated.

PowerPoint's online assistance and ease-of-use touches compare well with those of SPC's Harvard Graphics, although it lacks many of Harvard's advanced features, such as network conferencing. PowerPoint's AutoContent Wizard asks you

questions about the subject of your presentation, then formats a show to match. Similarly, the Pick a Look Wizard can do much of the formatting of on-screen shows, handouts, and other presentation ele-

SINCE POWERPOINT LACKS built-in multimedia features, you use OLE and Windows' Media Player to Insert videos, animations, and sound in your shows.

ments, based on your answers to its queries.

PowerPoint relies on bundled applets, including WordArt and Microsoft Graph, to handle tasks such as special text effects and charting. While the applets provide most of the features you'd expect, a few are missing; you can't apply gradient tones to text blocks, for example, or create table charts. The library of transition effects, although large, is somewhat basic and utilitarian.

PowerPoint is the only package we tested that has no menu choices for multimedia; the only way to add media clips to a presentation is to insert them as OLE objects that are actually played back by Windows' Media Player utility. The program also lacks interactivity, except for the ability to launch external applications by inserting them into presentations as OLE objects.

Clearly, multimedia is not PowerPoint's strength. If you are looking for a conventional package with multimedia features, Harvard Graphics or Lotus Freelance will serve you better. PowerPoint's street price is \$339. *Microsoft Corp.*, 800/426-9400 Reader service no. 735

Midisoft Super Show & Tell 2.0

Multimedia B Conventional D

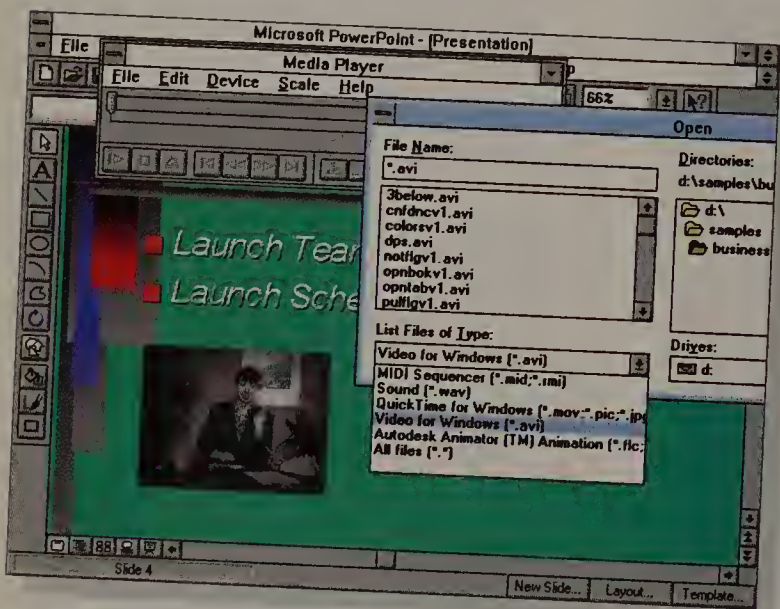
PROS: Unique single-screen interface, good multimedia and object-animation tools

CONS: No templates or outliner, poorly integrated charting features, weak text and art tools

Midisoft's Super Show & Tell (SST) ignores most of the conventions of other presentation packages. From its single-screen inter-

built-in multimedia elements, and the program will offer drag-and-drop sequencing controls for setting the order and timing of actions.

—Robert L. Lindstrom



Presentation Programs Get Ready for Windows 95

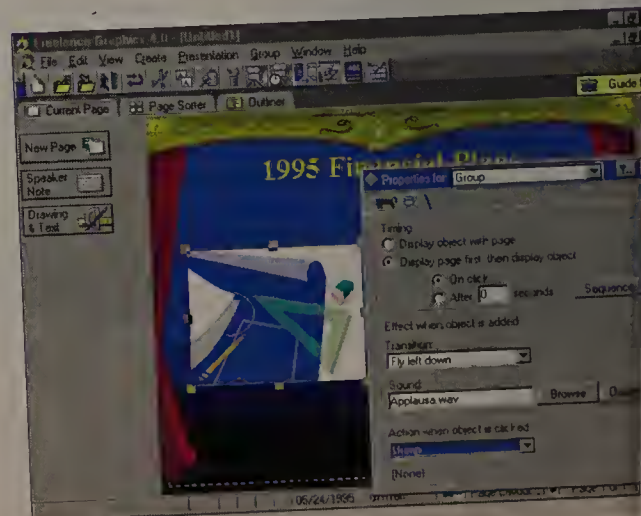
It's clear from our previews of upcoming Windows 95 versions of PowerPoint and Freelance that both Microsoft and Lotus envision on-screen delivery and multimedia as dominating the future of business presentations.

According to Microsoft, its next version of PowerPoint, dubbed PowerPoint for Windows 95, will include such features as preprogrammed interactive buttons, the ability to animate objects, and new templates with built-in transitions. The package will be able to generate meeting notes during a presentation, as

well as an action-item list at the show's end.

Similarly, Lotus Intends to make its Freelance Graphics more useful as an on-screen interactive business tool. The Windows 95 version will stress the concept of teamwork and collaboration, both in the creation of presentations and in the role they play as facilitators for individual and group communications. Lotus is developing additional SmartMaster templates with

FREELANCE GRAPHICS for Windows 95 includes built-in object animation tools.





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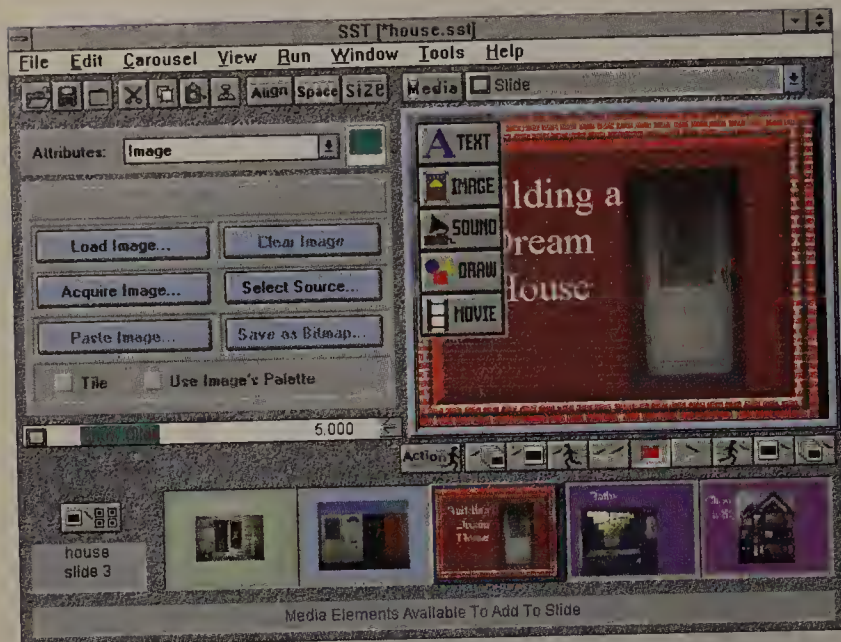
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SST'S UNIQUE INTERFACE places a reduced work area, multimedia controls, and timeline-like Playlist on a single screen.

best and are difficult to work with on the small screen preview, and there are no templates or outliner features to help you structure the presentation. Charting features are in a separate program module that makes you save a chart to

face to its lack of templates, an outliner, or hard-copy options, the program is clearly designed as an entry-level multimedia presentation tool, at an affordable vendor-estimated street price of about \$100. Version 2.0 was to be released at the end of July.

Unlike the other packages covered here, SST lets you create presentations using a single-screen interface that gives you access to all its tools without making you jump between multiple displays. A quarter-screen window serves as your slide creation area; below this window are small previews of five of your presentation's slides.

Once you've selected media elements and imported them onto slides, the program demonstrates some of its most serious shortcomings. Its drawing tools are mediocre at

disk as a .bmp file before you can place it in a presentation.

Still, SST gives you a decent assortment of graphics import filters, and it's easy to import sound, animation, and video files. It doesn't provide full-blown timeline editing, but it does let you control the synchronization and duration of each timed event on a slide using a feature called Playlist.

SST makes multimedia accessible and fun, but its limited features make it better for home, school, or low-end business presentation apps than for intensive professional use. *Midisoft Corp.*, 800/776-6434 Reader service no. 736

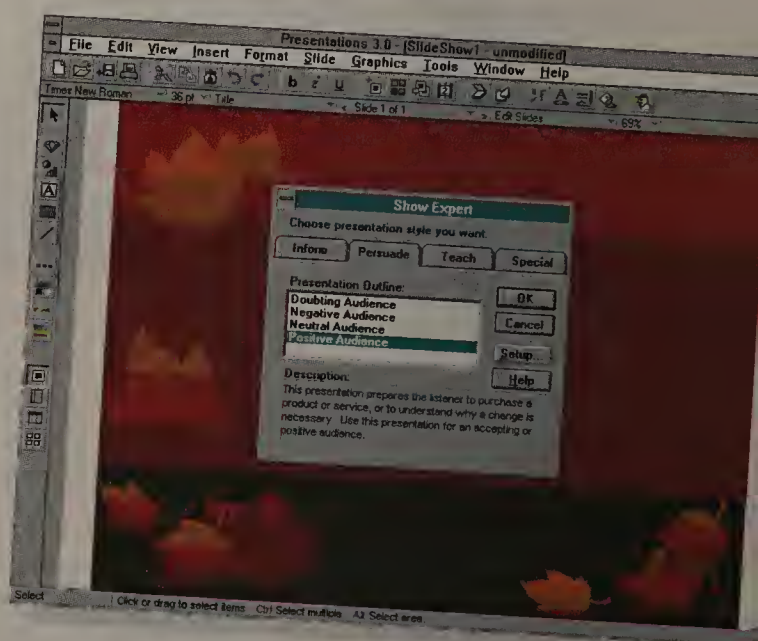
Novell Presentations 3.0

Multimedia C Conventional A

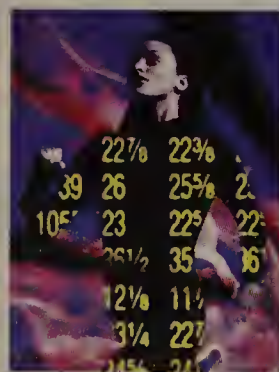
PROS: Easy yet sophisticated drawing tools, excellent content guide, well-designed templates

CONS: Limited multimedia support, poor interactivity tools

If there were an award for Most-Improved Presentation Software, Novell Presentations (a part of the PerfectOffice suite, and formerly called WordPerfect Presentations) would be the uncontested recipient. Version 3.0 elevates what was once an also-ran into a major contender; if not for the package's weak multimedia and interactivity, the pro-



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More Power Tools for Multimedia Presentations

use to supplement the features in your primary presentation program (prices given are list unless noted otherwise).

Alpha Software's Bravo has long been the low-price leader for basic presentation capabilities. The new version 3.0—still just \$79—improves what was previously a very limited feature set with new multimedia capabilities, including 25 screen-show transitions and chart

and object animation. *Alpha Software*, 800/451-1018 Reader service no. 739

Cinemar's Presentation World isn't a presentation package itself, but this multimedia CD-ROM is a virtual seminar on creating and delivering electronic business presentations. It includes video lectures by experts and a large selection of text articles. The disc is informative and engaging, but at an introductory price of \$195, it's not exactly an impulse item. *Cinemar Corp.*, 503/520-4460 Reader service no. 740

HSC Software's HSC InterActive (which lists for \$295) is a modified version of the high-end IconAuthor authoring product and uses

an icon-oriented flow-chart metaphor for developing presentations

and training programs. Its strength lies in its highly visual organization of your show's interactive structure and media events. *HSC Software*, 805/566-6200 Reader service no. 741

SPC's Harvard Spotlight (\$99) works with Freelance Graphics, PowerPoint, or Harvard Graphics to give presenters a special screen that displays a timer, previews of upcoming slides, and other information to help conduct a well-paced, confident show. The program works either with two PCs connected by serial cables or with a single computer using a special dual-output video card. *Software Publishing Corp.*, 800/234-2500 Reader service no. 767

—Robert L. Lindstrom and Harry McCracken

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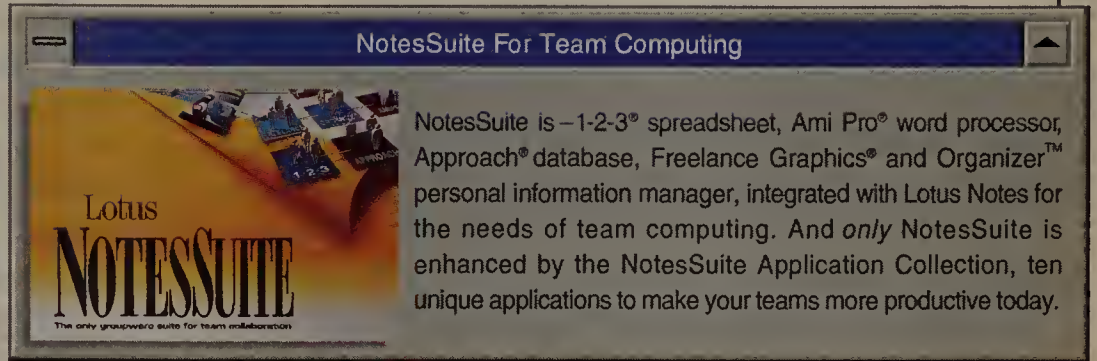
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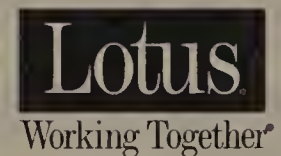
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*In Canada call 1-800-GO-LOTUS. †Source: "Lotus Notes: Agent of Change," International Data Corporation, 1994. ††\$299 per user license for Lotus NotesSuite Desktop. Minimum purchase of fifty licenses required. ©1995 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, Working Together, SmartSuite, Lotus Notes, 1-2-3, Ami Pro, Freelance Graphics and Approach are registered trademarks and NotesSuite and Organizer are trademarks of Lotus Development Corporation. All companies are registered trademarks of their respective companies.

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800-824-3323

Softmart
800-835-3725

CORPORATE SOFTWARE
800-718-4749

ASAP
800-248-ASAP

gram might very well have been a Best Buy.

While earlier versions of Presentations were sluggish and frustrating, the new release is as responsive as a well-trained circus dog. Its ease of use, too, has improved dramatically: An effective start-up routine leads you step by step through creating a presentation. You select a master background (from among some of the most attractive choices we've seen) and then choose a template. You can also have the program's Show Expert help you develop the content of your show. Presentations' is the best designed of all the content guides, although it would be nice to have more than 11 types of presentations to choose from.

Presentations 3.0 also stands apart from

most of its competitors with its sophisticated and easy-to-use drawing, painting, and effects features. Because it grew out of Draw-Perfect, an illustration program, Presentations contains such professional-level features as gradient text fills, 3-D effects, Bézier and spline tools, and emboss and blur bitmap effects. You can also warp objects or add a perspective effect, and the tools don't require any artistic skill on your part.

Unfortunately, the program shares many of the same multimedia shortcomings as its traditional-presentation peers. Its transition effects are easy to add but uninspired. You can add sounds to slides but not to individual objects. There is no path or chart animation, and the only way to add animation or

video is by using OLE 2.0 to get Presentations talking to an external program, such as Windows' Media Player. Worse than these inconveniences, though, is the program's clumsy approach to interactivity. You can't create on-screen interactive buttons or other objects, for instance; the best you can do is assign actions to particular keystrokes.

Presentations (street price: \$270) remains attractive if you need meaty graphics tools and can live with its minimal capacity for multimedia and interactivity. It's also the first package that users of WordPerfect and other Novell desktop applications should investigate, since it's very similar in design to its siblings in the PerfectOffice suite. *Novell Inc., 800/451-5151 Reader service no. 737*

Astound and Harvard Graphics Show Their Stuff

● = Yes ○ = No



Standard features	Adobe Persuasion 3.0	Gold Disk Astound 2.0	Lotus Freelance Graphics 2.1	Macromedia Action 3.0	Microsoft PowerPoint 4.0
Street price ¹	\$295	\$200	\$330	\$129, \$229 w/CD-ROM	\$339
Minimum/maximum disk space required (MB)	16/31	11/30	7/23	10/17	11/35
Clip art and multimedia elements	500	1364	500+	1000+ ²	1100
Support for OLE 1.0/OLE 2.0	●/○	●/○	●/○	●/●	●/●
Conventional presentation tools					
Outliner	●	●	●	●	●
Handouts/speaker notes	●/●	●/●	●/●	●/○	●/●
Chart types	84	31	108	32	84
Multimedia and screen-show features					
Maximum color depth	24-bit	24-bit	8-bit	24-bit	24-bit
Transition effects	15	45 slide, 100+ object	32	46	39
Interactive buttons or objects	●	●	●	●	○
Sound editor	○	●	○	● ²	○
User-definable object animation	●	●	○	●	○
Timeline synchronization of media	○	●	○	●	○
Graphic formats	BMP, CDR, CGM, DIC, EPS, GIF, PCD, PCT, PCX, PLT, PNT, TIFF, WMF, WPG, XLC	BMP, CGM, DIB, GIF, GRA, PCD, PCX, PICT, RLE, TIFF, WMF	BMP, CGM, DRW, DXF, GEM, GIF, PCX, PIC, TGA, TIFF	BMP, EPS, GIF, PCD, PCX, TIFF, WMF	ADI, BMP, CDR, CGM, DRW, EPS, HPGL, PCX, TIFF, WMF
Animation formats ³	PIC	AAS, AIM, AVI, AWA, AWM, FLC, FLI, SCM	LSM	FLC, FLI	through OLE only
Video formats ³	MIDI, MOV	DVI, MOV	through OLE only	AVI, MMM, MOV	through OLE only
Sound formats ³	WAV	CD, MIDI, WAV	WAV	CD, MIDI, WAV	through OLE only
Service and support					
Free support (days)	90	90	90	90	unlimited
Toll-free number	○	○	●	○	●
Weekday support (hours)	11	12	12	11	15



¹ Vendor estimate.

² CD-ROM version.

³ Formats supported out of the box; programs that offer OLE can incorporate virtually any media type using external applets and drivers.

SPC Harvard Graphics 3.0

Multimedia B Conventional A

PROS: Best combination of power and ease of use in a conventional package, comprehensive online help and design advice, Design Checker feature, multiuser network support

CONS: Modest multimedia features, design advice may be too elementary for experienced users



If you're new to presentations and are looking to get a leg up from your software, Software Publishing Corporation's Harvard Graphics 3.0 not only gets you into the saddle, it speeds you down the track and through the finish line as fast as any program on the market. Its combination of power and ease of use makes it

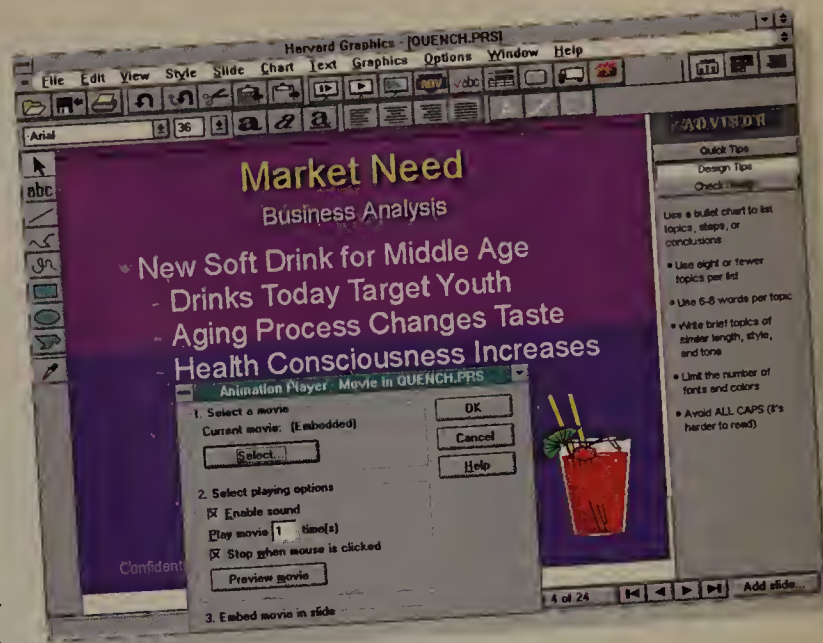
equally serviceable for beginners and experienced presentation creators, and it's our Best Buy among the traditional packages.

We're particularly impressed by the range of ways in which Harvard Graphics helps ensure that your presentations are coherent, well organized, and good-looking. A set of online tutorials introduces you to concepts such as building a chart, working with text, and delivering a presentation; you can then make use of the package's Quick Presentations—highly useful guides to building

presentations with specific themes, such as creating a business plan. Harvard's Advisor help system guides you through each major step of creating a presentation, and SPC's presentation experts will even provide you with personal design advice by telephone.

When you've finished roughing out a presentation, the unique Advisor Design Checker feature automatically evaluates your use of color and graphics, letting you know when you may have violated a rule of good design. While Harvard offers the best and most extensive design advice of any package we tested, don't expect miracles: The product's suggestions are aimed at beginners, and in our tests the Design Checker did not always follow its own advice when making changes to our shows.

Harvard's charting features allows you to format data into a large variety of chart types, with an unusually wide range of customization options. More-



HARVARD GRAPHICS' DESIGN HELP and other ease-of-use features shine, but the program also offers basic multimedia, including the ability to play animation clips.

advanced users may be interested in Harvard's unique conferencing ability, which allows you to distribute a single presentation in real time to as many as 64 computers over a network. The presenter can control and annotate the show while others watch, and can pass leadership to any participant in the conference.

Add the package's well-designed templates, powerful interactivity features, and excellent drawing module (Harvard F/X), and you have everything you need to create conventional slide shows quickly and easily. But if it's multimedia you're after, you'll have to keep your ambitions in check. While Harvard Graphics is the only one of the conventional products to include a built-in animation player, it provides just a few animations to choose from, and they're difficult to position on the screen. The package also includes a video player applet, although the process for specifying a clip's position and sound level is cumbersome.

Still, this package shines as an all-around conventional presentation product. In a software market dominated by suites like Microsoft Office, it's rare for a stand-alone product to rise above its competition in usability and features—but Harvard Graphics does just that. The program is street-priced at \$289; users of earlier versions—and of competing presentation and suite packages—can upgrade for less than \$100. *Software Publishing Corp., 800/234-2500 Reader service no. 738*



Midisoft Super Show & Tell 2.0	Novell Presentations 3.0	SPC Harvard Graphics 3.0
\$100	\$270	\$289
8/8	12/32	9/24
486	1154	700+
0/0	●/●	●/0

○	●	●
●/0	●/●	●/●
12	48	88

24-bit	24-bit	24-bit
35	33	51
●	○	●
○	○	○
●	○	○
●	○	○
BMP, DIB, GIF, JPG, PCX, TGA, TIFF, WMP	BMP, CGM, CHT, DXF, EPS, PCX, PIC, PPT, SHW, TGA, TIFF, WMF, WPG	BMP, CDR, CGM, CHAT, CH3, CRW, EPS, GIF, PCX, Photo CD, PICT, PICT2, TIFF, WMF, WPG
FLC, FLI	through OLE only	AIM, SCM, SWM
AVI	through OLE only	AVI, AVS
MIDI, WAV	CD, MIDI, WAMI, WAV	MIDI, WAV

unlimited	180	30
○	●	●
9	12 ⁴	12

⁴ Optional weekend support.

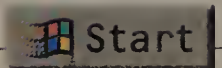
Note: All products evaluated for Windows.

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New Pentium-133 PCs outperform everything else on the desktop. But are they better values than

Pentium-100s or 120s? **This month's top Best Buys:** the Dell Dimension XPS P100c, Micron 4100 Magnum,

Toshiba T4900CT, and WinBook XP SX-33 Monochrome. **By Rex Farrance and Melissa Riofrio**

Top 20 PCs

How Much Speed

Do You

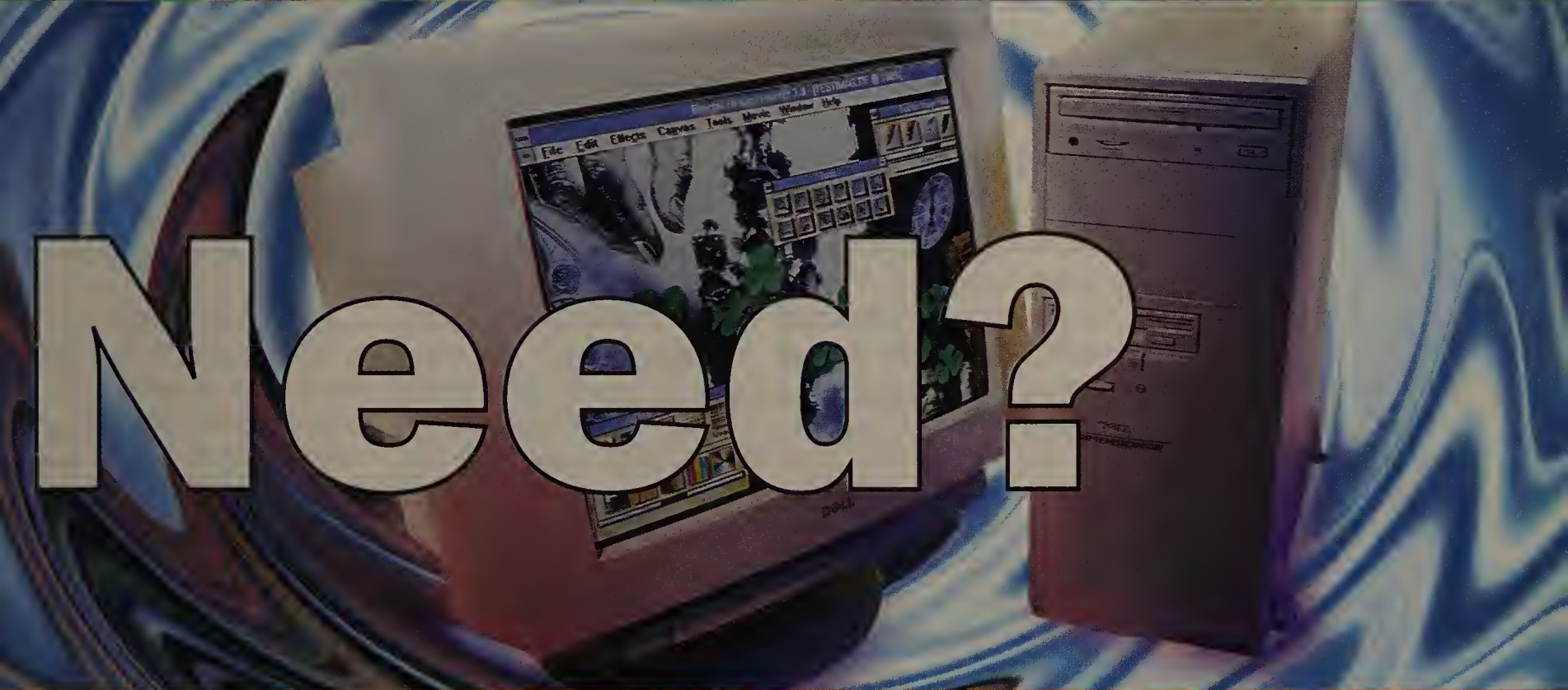
Here we go again. Another Intel announcement, another fast new Pentium CPU, and another helping of industry hype. The latest processor is the Pentium-133, and—no surprise—the first systems using it are the fastest we've ever tested. But there's no free lunch: PCs with this new processor cost \$300 or so more than a comparably configured 120-MHz system. The extra dough buys you a significant but modest performance boost of around 7 percent over similar PCs. Does the extra speed justify the added expense? Yes—if you need every

last ounce of performance. Two of the first three high-priced P-133s pack the value of power desktop Best Buys.

If you aren't willing to pay the price for absolutely peak performance, you can still benefit from the downward pressure on the prices of Pentium-100 and 120 PCs. There are some great deals available on the former. For example, Dell's newest Dimension XPS P100c (which is much faster than the early Dimension 100 reviewed last March) delivers fine Pentium-100 performance and a 17-inch monitor at a user-friendly \$3178 price.

That's the kind of balance a PC needs to win a number one power desktop Best Buy. On the other hand, the number two Dell Dimension XPS P133c has a heady cost of \$3999. Granted, the P133c comes with a more robust configuration, including a fast high-quality fax-modem and excellent wave-table sound. Both Dells come with a 64-bit graphics controller that works with the included MPEG software to provide smooth full-screen, full-motion video.

Completing Dell's sweep of the three top spots, the \$4289 Dimension XPS



FIRST PENTIUM 133s:
Micron's P183
Millennia, Dell's
Dimension XPS183c,
and Gateway 2000's
P5-183XL.

P120c, first reviewed in June, provides a classy configuration, fine performance, a 128-bit graphics controller (now optional with all Dimensions), and Dell's superb service and reliability.

As usual, Micron makes its presence felt near the head of the class. The ultrafast P100 Millennium is an affordable \$3069 Pentium-100 multimedia PC and our number four power Best Buy. Micron's Pentium-133 is our fifth power Best Buy. It provides leading-edge performance, multimedia capabilities, and a 1624MB hard drive—along with Micron's well-deserved reputation for outstanding support. This P-133 also has the first 6X CD-ROM drive we've had in a system, Plextor's 6Plex. Like the quad-speed CD-ROM changer in the Gateway 2000 P5-120XL and P5-133XL, this CD-ROM drive is something special. This month systems from Dell and Micron won half the positions on our Power Desktops Top 20—a testimonial to the consistent values these companies deliver.

On the Budget Top 20, the beat goes on, with more and better for less. Our top machine here is a new and improved Micron 4100 Magnum—replacing its namesake, which had been on our budget chart for almost a year. This fast DX4-100 comes with a multimedia configuration and a 1278MB hard drive for an impressively low

Buying Smart: Consumer Tips

Use a credit card.

Unless you already have a credit arrangement with the vendor, use a credit card to order all equipment. The credit card company can help mediate any disputes that arise or can give you a refund if you fail to receive a product you've paid for.

Buy a system with a flash BIOS.

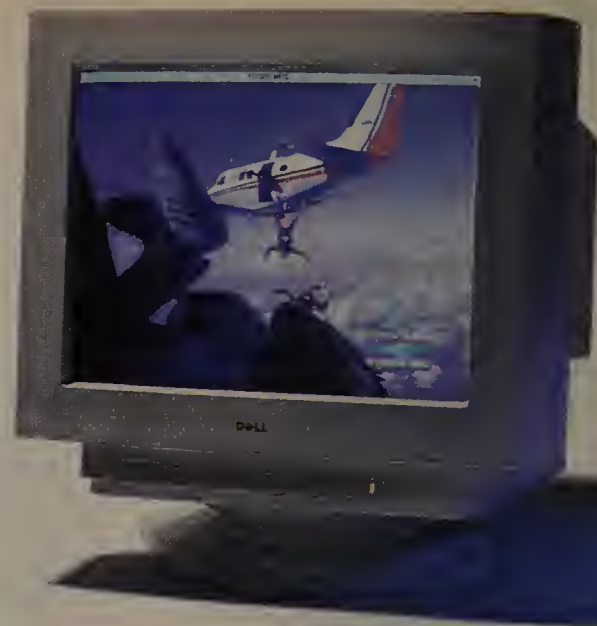
Make sure your new system has a flash BIOS. Many compatibility

problems can be corrected with a BIOS update supplied by the system vendor. Because a flash BIOS is software-upgradable, a BIOS correction is as easy as running a program off a floppy disk.

Protect PC and data with a UPS.

A UPS is more than just a backup battery that kicks on and keeps your PC running when the power fails. Today's best units also condition power, trimming system-

THE MPEG CAPABILITIES of the Dell Dimension XPS P133c let you enjoy action clips and movies in smooth full-motion video.



get Desktops Top 20 in months to come, we expect to see low-cost Pentium-75s and 90s competing with

DX4-100s and a sprinkling of NexGen-based systems, while the power chart will remain the domain of the Pentium heavyweights.

So which Pentium is the top power value? Is it the Pentium-100, the Pentium-120, or the Pentium-133? For the moment, 133-MHz PCs are clearly the performance champs and a logical choice for desktop publishing, design, and similarly demanding work, while Pentium-120s provide a lot of muscle at a somewhat lower cost. For typical processor-intensive business use, however, we think

Pentium-100s are the best value, providing terrific performance at a quite reasonable price point. Comparably equipped P-100s run about \$600 less than P-133s, and while the first Pentium-133s tested out around 25 percent faster than our P-100 average, the performance-tuned 100s on our Top 20 are fast enough to give 133s a much closer run for their money.

Rex Farrance is a senior associate editor and Melissa Riofrio an associate editor for PC World. They can be reached on PC World Online (see page

\$1999 price. Also new this month, the DTK Quin-35M/75 parlays a great \$1890 price, fine Pentium-75 performance, and a multimedia configuration into a number three Best Buy. Our number four unit is another first, a Pentium-90 budget Best Buy. The \$2198 Micron P90 Home MPC is a basic Pentium multimedia PC.

Notebook rankings remained fairly stable this month, with just two new power units jumping onto our list. Fresh testing proves the DX4-75 Compaq LTE Elite 4/75 CXL (first reviewed last October) to still be a worthy contender, and the brand-new Gateway 2000 ColorBook2 is one of the fastest DX4-100 notes available.

With 16 fresh systems added to our charts this month, we're seeing steady changes in the PCs that make up the best values. Not long ago, Pentium-90s represented the power class, and Pentium-60s and 66s made up the Pentium contingent on the budget chart. Now, older-technology Pentium-60s and 66s seem to be disappearing from the market, with a few bargains remaining. On our Bud-

ing spikes and allowing you to safely work through brownouts—often without having to go to battery. Some units come with software that will automatically manage any emergency shutdowns. Prices run from about \$200 to \$400 for units that can handle a powerful PC and its peripherals, and the top vendors include lifetime coverage against power-related damage for the UPS as well as all connected equipment.

12 for contact information). PC World staff members Michael Desmond, John Goddard, and Arden Hoffman and freelance writer Jon L. Jacobi contributed to this article. Testing by Dave Casini and Susan Silvius; research and support by Andrew Hawn.

Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) to order fax copies of system reviews. You can order three systems' capsule reviews (\$4.95), a single capsule review plus features table and test report (\$4.95), an entire month's review (\$9.95), and a list of all systems tested by the PC World Test Center (\$4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, \$9.95; available July 26). Touch-tone telephone required.

For more information about all products in this article, circle reader service no. 902.

New Remote Software Sets Windows Speed Record

Fastest Modem Communications

Winner of PC World's "Best Buy" and PC Magazine's "Editors' Choice" awards for remote communications software, Close-Up has a brand new version that lets you view & control other PCs by modem — just as if you were there!

"Version 5.0 Close-Up was fast, but Version 6.0 has even better Windows performance and added features to keep it ahead of the pack."

— PC Magazine, July 1994

Why Is Close-Up So Fast?

Close-Up learns as it works. It uses AI (Artificial Intelligence) to compress all Windows video function calls. That's why Close-Up does so well in Windows Benchmark tests (see WinBench 95 chart).

Close-Up uses its revolutionary Photographic Memory™ so that once Close-Up has seen all or part of a Windows screen, it's memorized. Then as screens change, Close-Up only transmits new unmemorized data. Incredibly, with this technology Close-Up gets faster & faster the longer you use it.

Expert System Makes Communications Easy

You don't have to be a communications expert to get the results of one. Close-Up has an Expert System that automatically analyzes system components and configures your system for maximum speed.

WinBench™ 95 Ver 1.0 by Ziff-Davis Labs Tests Remote Windows™ Speed

The graph on the right shows the speed of the three leading remote control programs when transferring Windows screens. As you can see, Close-Up handles more pixels faster, meaning you spend less time waiting for Windows screens to transfer.

WinBench scores (average of 10 runs):

Close-Up 209,270
pcAnywhere 122,600
Reachout 101,900

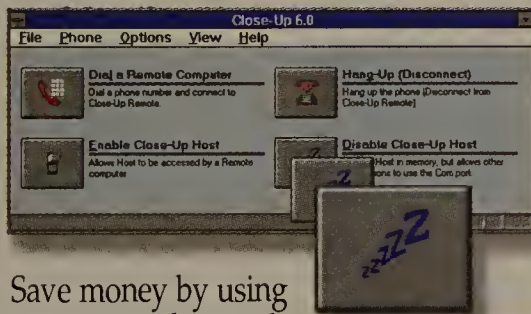
WINDOWS & DOS

Close-Up saves time & money by allowing you to connect between PCs running DOS or Windows, eliminating the need to switch between products when connecting to different PCs.

Non-Intrusive Technology

Unlike most remotes, Close-Up's installation does not modify any of your sensitive Windows files, including the SYSTEM.INI and WIN.INI files, allowing Close-Up and your PC to run at optimal levels.

Use Close-Up and Your Fax Software on One Modem



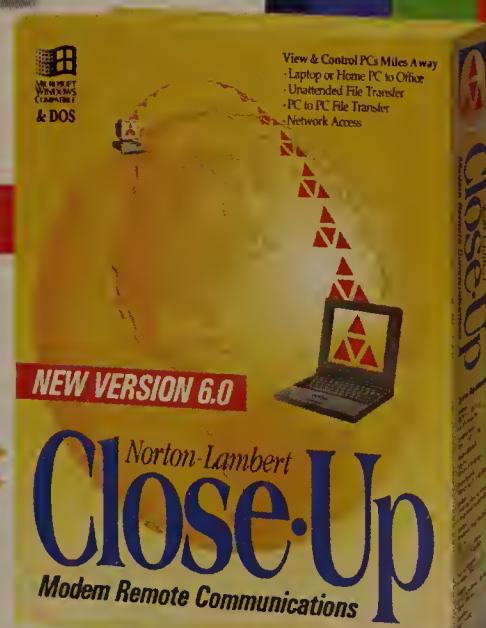
Save money by using just one modem with Close-Up and your fax software. Simply click the Close-Up sleep icon. What could be easier!

RISK FREE MONEY-BACK GUARANTEE

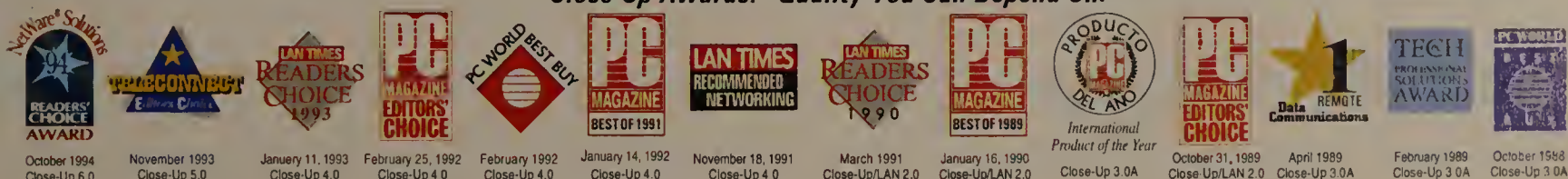
Try Close-Up 6.0! If you're not absolutely convinced that Close-Up 6.0 is the fastest remote program, we'll give your money back! Order Close-Up Host & Remote, a complete system for only \$199*. Upgrade your competitive communications program for only \$69⁹⁵.

▶ ▶ ▶ **Order Today 805-964-6767**

We invite you to reproduce this test. Modems: Hayes OPTIMA 288 V.F.C. Computer: (Host) Gateway, (Remote) Micron, Pentiums 90Mhz, 32MB RAM, 128KB RAM cache, 500MB HD, IDE controller, no hardware disk cache. Video: (Host) STB Lightspeed 1MB VRAM, (Remote) Diamond Stealth 64 2MB VRAM. 800 x 600 pixels, 16 colors. SuperVGA.DRV 11/1/93. 75 Hz. MS-DOS 6.22, SMARTDRV 2MB cache. WinBench 95 is available on ZiffNet via CompuServe. All products are shipping versions. Test performed without verification by Ziff. WinBench trademark of Ziff-Davis Publishing Co. Windows trademark of Microsoft Corp. *60 day money-back guarantee if purchased directly from Norton-Lambert. Offer expires 10/31/95. All prices in US Dollars. Prices exclude shipping.



Close-Up Awards. Quality You Can Depend On.



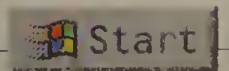
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הממשלתית

On August 24th don't plan
53rd world science fiction

on spending the entire day at the
convention in glasgow, scotland.

you decide. the on-line Windows® 95 launch. starting august 24 ~ <http://www.microsoft.com>

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THE TOP 20

PC WORLD



1 Dell Dimension XPS P100c
Quick P-100, big monitor.

POWER DESKTOPS

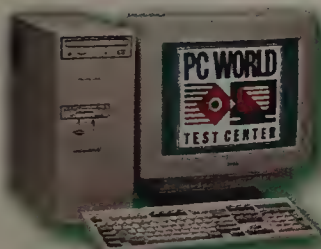
		Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Dell Dimension XPS P100c	—	1	current	83	100	71/73	\$3178	Pentium-100	16	1083
2	Dell Dimension XPS P133c	—	1	current	83	109	71/73	\$3999	Pentium-133	16	1080
3	Dell Dimension XPS P120c	1	3	June 95	82	102	71/73	\$4289	Pentium-120	16	1624
4	Micron P100 Millennia	—	1	current	81	107	65/69	\$3069	Pentium-100	16	1278
5	Micron P133 Millennia	—	1	current	81	119	65/69	\$4399	Pentium-133	16	1624
6	Micron P120 Millennia	2	3	June 95	80	111	65/69	\$3799	Pentium-120	16	1278
7	AT&T Globalyst 630	4	2	July 95	79	93	75/67	\$4007	Pentium-100	16	1084
8	Gateway 2000 P5-133XL	—	1	current	78	120	58/61	\$4399	Pentium-133	16	1624
9	Dell Dimension XPS P90	3	6	Mar 95	78	83	71/73	\$3133	Pentium-90	16	1083
10	HP Vectra VL3 5/120	5	3	June 95	78	90	78/73	\$3700	Pentium-120	16	853
11	Digital Celebris XL 590	10	4	May 95	77	86	75/73	\$4818	Pentium-90	16	1083
12	Dell OptiPlex XMT 590	6	8	Jan 95	77	82	71/75	\$3184	Pentium-90	16	1083
13	Gateway 2000 P5-120XL	7	3	June 95	76	113	58/61	\$4299	Pentium-120	16	1624
14	Gateway 2000 P5-100XL	12	3	June 95	76	111	58/61	\$3699	Pentium-100	16	1083
15	Dell OptiPlex XMT 5100	8	4	May 95	76	83	71/75	\$4049	Pentium-100	16	1083
16	Micron P90 Power Station	11	7	Feb 95	76	86	65/69	\$2899	Pentium-90	16	1080
17	NEC Ready 9510	9	2	July 95	76	80	64/71	\$3006	Pentium-90	16	1278
18	Quantex QP5/100 XM-4	—	1	current	76	89	58/67	\$2899	Pentium-100	16	1200
19	Digital Celebris XL 5120	—	1	current	75	94	75/73	\$5728	Pentium-120	16	1021
20	Compaq Deskpro XL 575	—	1	current	75	73	81/77	\$3949	Pentium-75	16	1083



¹ Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews (\$4.95), a single

capsule review plus features table and test report (\$4.95), an entire month's review (\$9.95), and a list of all systems tested by the PC World Test Center (\$4.95). In addition, you can order next month's Top 20 charts and capsule reviews

2 Dell Dimension XPS P133c
P-133 has video capabilities.



3 Dell Dimension XPS P120c
This P-120 has it all.

4 Micron P100 Millennia
Very fast P-100, good price.



5 Micron P133 Millennia
P-133's as fast as they come.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number ¹	Reader service no.	Comments	 Recommended as home system
4X	ISA, PCI	17"/.28	800/289-3355	3265	636	Workstation version replaces March XPS P100. Fast unit lacks optional sound, office software.	
4X	ISA, PCI	17"/.28	800/289-3355	3266	637	Fine performance, reliability, and service; excellent configuration; software MPEG.	
4X	ISA, PCI	17"/.26	800/289-3355	3241	638	This 120 costs more than Dell's 133, adds 128-bit graphics controller and bigger hard drive.	
4X	ISA, PCI	15"/.28	800/223-6571	3267	639	Good price, great 100-MHz performance, solid configuration make for a winner.	
6X	ISA, PCI	15"/.28	800/223-6571	3268	640	Superb performance, solid configuration with 6X CD-ROM drive. Pricy, like other 133s.	
4X	ISA, PCI	15"/.28	800/223-6571	3242	641	With its excellent performance, this 120 makes a great alternative to the pricier 133s.	
4X	ISA, PCI	17"/.27	800/447-1124	3252	642	Swift Pentium-100 desktop with a big monitor and nice telephony features.	
4X	ISA, PCI	17"/.25	800/846-2000	3269	643	Pricy 133 is superfast like Micron's, with a tempting configuration, CD-ROM changer.	
4X	ISA, PCI	15"/.28	800/289-3355	3202	644	Longtime P-90 favorite is now outshone by more powerful siblings.	
2X	ISA, PCI	15"/.28	800/322-4772	3243	645	Tough competition lowers this two-time Best Buy's rank. Fairly slow for a Pentium-120.	
2X	ISA, PCI	17"/.26	800/722-9332	3223	646	Fine Pentium-90 performance, big monitor, high price on corporate PC from big vendor.	
4X	ISA, PCI	15"/.28	800/289-3355	3173	647	Dell configures and tests this PC line for trouble-free use on LANs in a corporate environment.	
4X	ISA, PCI	17"/.25	800/846-2000	3244	648	Pricy 120 is one of the fastest. Has a great configuration, CD-ROM changer.	
4X	ISA, PCI	17"/.25	800/846-2000	3245	649	Fastest Pentium-100 we've ever tested comes with a solid configuration.	
4X	ISA, PCI	15"/.28	800/289-3355	3222	650	Corporate PC aimed for use in LAN environments has better warranty than Dimensions do.	
4X	ISA, PCI	15"/.28	800/223-6571	3184	651	Solid Pentium-90 with long run on list is being pushed downward by fast competition.	
4X	ISA, PCI	15"/.28	800/632-4636	3253	652	Multimedia and telephony make this unit excellent for home and business use.	
4X	ISA, PCI	17"/.26	800/896-4898	3270	653	Lowest-priced Pentium-100 on this chart has a big monitor and hard drive.	
4X	ISA, PCI	17"/.28	800/722-9332	3271	654	Pentium-120 is aimed at corporate buyers, lacks sound, and is very expensive.	
—	EISA, PCI	15"/.28	800/345-1518	3272	655	Corporate EISA PC has great support. Slowest unit on list, and pricy for a Pentium-75.	

in advance (The Top 20 Flash Report, \$9.95; available July 26). Touch-tone phone required.

For more information about all products in this table, circle reader service no. 903.

Top 20 Power Desktops

IT'S SHAKEDOWN TIME—FOUR NEW BEST BUYS nudge some worthy contenders down in the rankings. Two of the new chart-toppers are Pentium-133s: the number two Dell Dimension XPS P133c and the number five Micron P133 Millennium. At \$3999, the Dell is fast and has a 17-inch monitor and full-motion video. The \$4399 Micron is ultrafast and features a 6X CD-ROM drive. There are also two new Best Buy Pentium-100s: the \$3178 Dell Dimension XPS P100c at number one and the \$3069 Micron P100 Millennium in fourth place. The excellent Dimension XPS P120c, reviewed in June, drops to number three in this company. The third of this month's P-133s, the Gateway P5-133XL, is extremely fast and a strong power contender, although it doesn't match Dell's and Micron's ratings for reliability and service. Top 20 PCs from Compaq, Digital, and Quantex are also new this month.

1 Dell Dimension XPS P100c

NEW THIS MONTH

PROS: Big hard drive, 17-inch monitor, good performance, full-motion video, top-notch service

CONS: One-year warranty, no sound card or speakers, seven-day repair turnaround

After we first reviewed the Dimension XPS P100 in March, Dell told us that its new graphics and hard disk drivers would improve performance. This month's testing proves Dell's case, with an overall performance improvement of about 30 percent. Contributing are the 16MB of fast Extended Data Out (EDO) RAM, ultraefficient 256K pipeline-burst secondary cache, and faster 1083MB Mode 4 PIO hard drive. Other enhancements include a 17-inch monitor and a 4X CD-ROM drive. With its improvements, this \$3178 minitower Workstation version is a winning power business PC and our new number one Best Buy.

A nice touch is the 2MB Number Nine FX Motion PCI graphics controller with software MPEG for smooth full-motion video. The one-year warranty on Dell's Dimension line is minimal these days, but Dell rates as one of the best in providing service and reliability. With its feature-rich package, great price, and very good performance, this P-100 leapfrogs its power desktop competition.



Dell P100c

2 Dell Dimension XPS P133c

NEW THIS MONTH

PROS: Excellent performance, 17-inch monitor, graphics controller with software MPEG support

CONS: One-year warranty, seven-day repair turnaround

In typical Dimension fashion, this Pentium-133 minitower immediately grabs a Best Buy. It outperforms the Dell Pentium-120 reviewed in June by about 7 percent, although it doesn't match the P-133 Micron and Gateway pacesetters (which beat it by about 10 percent). The \$3999 price (actually reasonable for a 133) illustrates the premium associated with Intel's fastest CPU. You get 16MB of EDO RAM, a big 512K pipeline-burst secondary cache, and a 1080MB Mode 4 PIO hard drive.

Dell's quad-speed CD-ROM drive, Sound Blaster AWE32 wave-table sound card, and Yamaha speakers are excellent; the 64-bit Number Nine FX Motion PCI graphics controller supports software MPEG. We didn't do extensive testing, but the clips we ran full screen on the big 17-inch monitor were remarkably smooth. There's just a one-year warranty on Dimension PCs, but you also receive 24-hour tech support and a year of on-site service. Dell manuals are well illustrated and clear. You're paying a premium for the Pentium-133 processor, but this unit is still a fantastic Best Buy. And the MPEG capabilities throw in an element of pure fun.



Dell P133c

3 Dell Dimension XPS P120c

REVIEWED: June 1995

PROS: Excellent performance; outstanding, full-featured configuration

CONS: One-year warranty, seven-day repair turnaround, high price

The \$4289 price is high, but who can argue with these specs: 16MB of RAM, 256K of secondary cache, a 1624MB hard drive, and a 17-inch monitor with a 4MB 128-bit PCI graphics controller. (Although our June test unit had no free SIMM sockets, Dell assures us this model is sold configured with two sockets open.)

4 Micron P100 Millennium

NEW THIS MONTH

PROS: Scorching Pentium-100 performance, big hard drive, good price

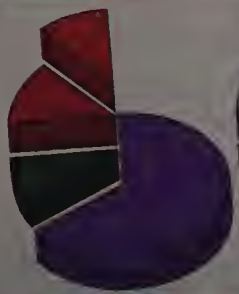
CONS: One-year warranty is short these days

Micron's new 100-MHz Millennium minitower beats almost every other P-100 we've tested, outdoing a few Pentium-120s in the bargain. This PC goes beyond just hot performance, delivering a reasonable \$3069 price and a sterling combination of features that earn it a solid power desktops Best Buy. This system has the Millennium series' performance enhancements, including 16MB of EDO RAM and 256K of Micron's speedy SyncBurst cache. The company provides a big 1278MB Conner Enhanced IDE hard drive, a 2MB Diamond Stealth 64 PCI graphics controller, a quad-speed CD-ROM drive, a Sound Blaster 16 card, and speakers. Bundled software includes Microsoft Office Professional and

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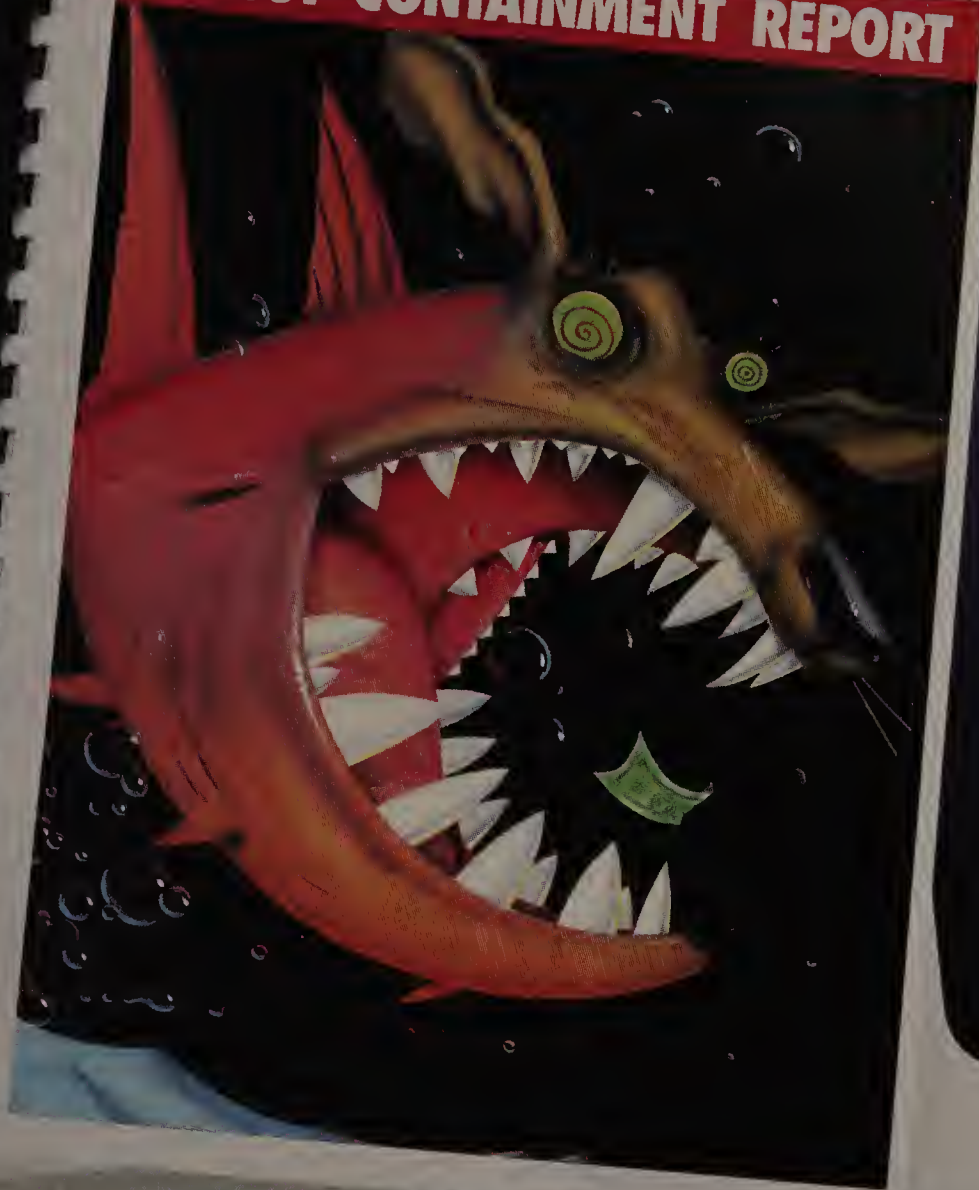


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[1] CARR Report No. 110.3A "Does Colorship?", Cahners Publishing Co.
[2] "Update on split run tests on color #20"; internal report of color vendor per Association of America.

COST CONTAINMENT REPORT

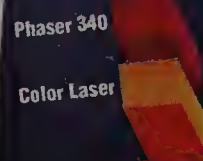


Business Color Printer

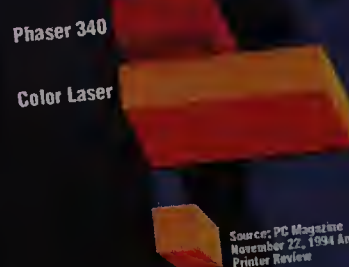
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Source: PC Magazine
November 22, 1994 Annual
Printer Review

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Bookshelf. If anything is lacking from the roster of impressive components, it's a 17-inch monitor to match the fine graphics controller. The 15-inch ADI MicroScan 4V has a 13.7-inch-diagonal

viewable display. Although a year of on-site service is included in Micron's warranty, the one-year coverage is minimal in today's PC market. In our most recent reports on Micron's reliability and support, the company didn't match its best service scores from the past, although reliability improved. And our readers still rate Micron above average overall. You get 13 hours of toll-free tech support per weekday and 9 hours on Saturday. The P100 Millennium is a great PC, especially when you consider its reasonable price. In fact, we wouldn't hesitate to buy one for ourselves.



Micron P100

.....

5 Micron P133 Millennium

NEW THIS MONTH

PROS: One of the two fastest machines we've ever tested, 1624MB hard drive, 6X CD-ROM drive

CONS: One-year warranty, high price

Micron systems generally provide superior performance and great value, and the P133 Millennium is another winning effort. It's one of the two fastest PCs we've ever tested—and our number five Best Buy. This Pentium-133 has 16MB of EDO RAM and 256K of SyncBurst secondary cache. With its hefty 1624MB Mode 4 PIO Western Digital Caviar hard drive, disk-intensive performance is excellent. The \$4399 price isn't out of hand for a top power minitower, but you're definitely paying for the 133-MHz processor. The Diamond Stealth 64 card with 2MB of fast VRAM is a great PCI graphics controller—it would be even better with a 17-inch monitor. The Millennium's multimedia setup includes the brand-new, superfast Plextor 6X SCSI CD-ROM drive, a Sound Blaster 16 sound card, and good-quality Jensen speakers. Microsoft Office Pro and Bookshelf are also included.

Tech support is available 13 hours per weekday and 9 hours on Saturday, and Micron has a well-deserved reputation for service. While Micron systems usually run our test suite without any trouble, this unit had to have its Windows graphics drivers changed to an earlier version to complete our Freelance test successfully.

This Best Buy powerhouse isn't for the faint of budget, but no Pentium-133 is. Its top-grade performance, huge hard drive, and great software bundle make it an outstanding choice for users seeking ultimate power.



Micron P133

6 Micron P120 Millennium

REVIEWED: June 1995

PROS: One of the fastest systems we've tested, 1278MB hard drive, quad-speed CD-ROM drive

CONS: One-year warranty is on the short side for a computer today

7 AT&T Globalyst 630

REVIEWED: July 1995

PROS: Very fast Pentium-100 performance, great reliability record, 17-inch monitor, quad-speed CD-ROM drive, great expandability

CONS: Documentation is too technical for many users, high \$4007 price

8 Gateway 2000 P5-133XL

NEW THIS MONTH

PROS: Blazing speed, 1624MB hard drive, 17-inch Trinitron monitor, CD-ROM changer

CONS: High price, no established repair turnaround policy, documentation lacks detail

Technically, this torrid Pentium-133 is the fastest system we've tested, although its performance virtually ties the Micron P133 Millennium's. With 16MB of EDO RAM, 256K of pipeline-burst secondary cache, and a 1624MB hard drive, this is a beautifully configured tower. But like other P-133s, this \$4399 unit's not cheap.

The 17-inch Gateway Trinitron, with its razor-sharp display, is a great match for the ATI GX Mach 64 PCI graphics controller. One thing to note: In order to maintain display integrity, Trinitrons from every manufacturer have a wire (two on a 17-inch unit) that keeps the aperture grille from expanding.

The presence of each wire causes a faint line to appear across the screen. Some users have had Trinitrons for years without even noticing the lines; others find them distracting. If you have any doubt, check out a Trinitron monitor before you buy.

The P5-133XL uses a quad-speed CD-ROM changer that handles three CD-ROMs at once. The Ensoniq sound card supports wave-table recording and playback, and you get good Altec Lansing speakers, a 14.4-kbps fax-modem, and Microsoft Office.

Gateway's service-and-support policies include a three-year parts warranty, but there's no established turnaround time on factory repairs. Scores on our Reliability and Service Monitor run about average. With the Dell and Micron 133s, better-than-average reliability and service is enough to mitigate their high prices and allow them to win Best Buys. Although this Gateway doesn't make our top five, its superb performance and outstanding configuration still make it a compelling buy for power users.



Gateway

9 Dell Dimension XPS P90

REVIEWED: March 1995

PROS: Fast performance, 1083MB hard drive, 4MB PCI graphics controller, high support rating

CONS: One-year warranty, seven-day turnaround on factory repairs

10 HP Vectra VL3 5/120

REVIEWED: June 1995

PROS: Excellent design and construction, great manuals, top-ranking service and support

CONS: Performance on this early model, while good, is closer to that of a Pentium-100

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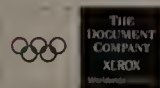
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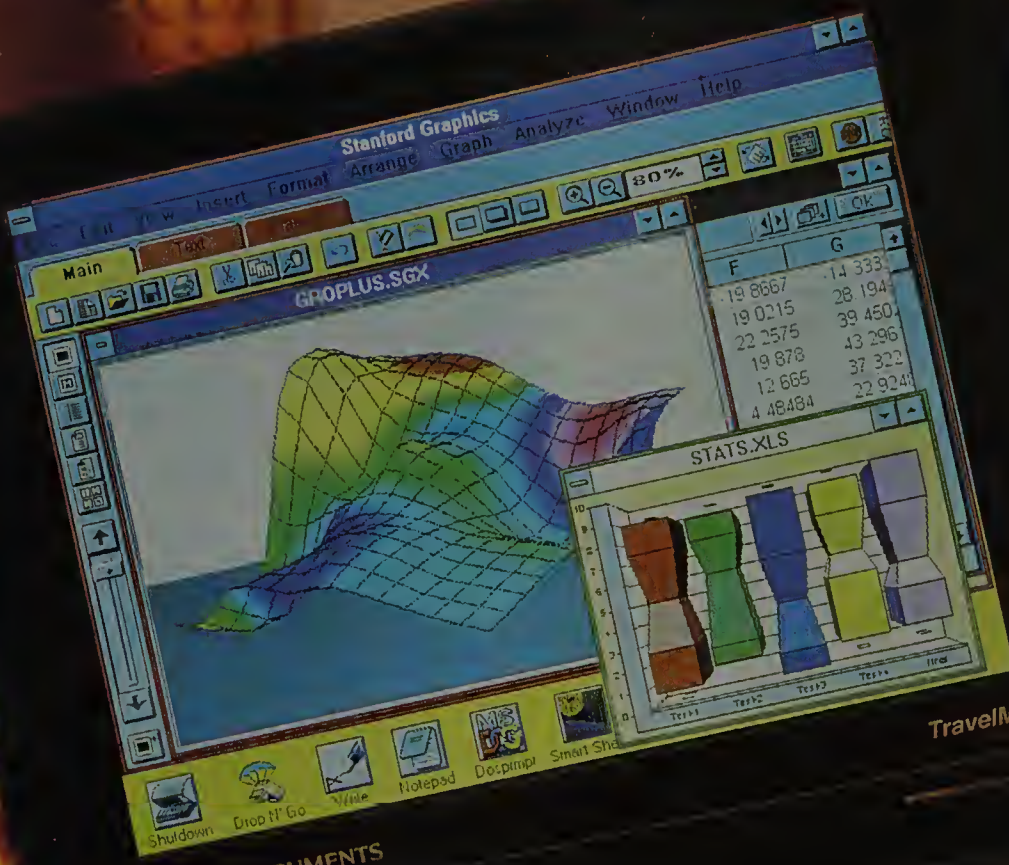


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11 **Digital Celebris XL 590**

REVIEWED: May 1995

PROS: Fast, capable of using a second Pentium-90 CPU, 1083MB hard drive, 17-inch monitor

CONS: Even with a price drop to \$4818, it's still expensive for a Pentium-90 system

12 **Dell OptiPlex XMT 590**

REVIEWED: January 1995

PROS: Top-notch Pentium-90 performance, spacious 1083MB hard drive, three-year warranty

CONS: Seven-day turnaround time on factory repairs is unusually long

13 **Gateway 2000 P5-120XL**

REVIEWED: June 1995

PROS: Terrific performance, 1624MB hard drive, 17-inch monitor, three-CD-ROM changer

CONS: The \$4299 price is high for most business and home buyers

14 **Gateway 2000 P5-100XL**

REVIEWED: June 1995

PROS: The fastest Pentium-100 we've tested, 1083MB hard drive, quad-speed CD-ROM drive

CONS: No free SIMM sockets, no repair turnaround policy, documentation lacks detail

15 **Dell OptiPlex XMT 5100**

REVIEWED: May 1995

PROS: Great reliability and service ratings, 1083MB hard drive, three-year warranty

CONS: Dell's seven-day turnaround on factory repairs is longer than typical

16 **Micron P90 Power Station**

REVIEWED: February 1995

PROS: Excellent Pentium-90 performance, 1080MB hard drive, good service and reliability

CONS: The one-year warranty mars an otherwise solid service-and-support package

17 **NEC Ready 9510**

REVIEWED: July 1995

PROS: 1278MB hard drive, good reliability and service

CONS: Cluttered interior makes upgrading difficult, 1MB graphics memory limits resolutions

18 **Quantex QP5/100 XM-4**

NEW THIS MONTH

PROS: Big hard drive, 17-inch monitor, fax-modem, multimedia configuration, reasonable price

CONS: One-year warranty is short these days, crowded interior

It's unusual to find a Pentium-100 tower system for just \$2899—especially one with 16MB of RAM, a 1200MB hard drive, a 17-inch Mag monitor, a quad-speed CD-ROM drive, a 16-bit sound card, speakers, and a 14.4-kbps fax-modem.



Quantex

You also get Quicken Special Edition, Compton's Interactive Encyclopedia 95, and WordPerfect PerfectOffice. As with most Quantex PCs, this unit's performance is just middling. The on-site service warranty covers the machine for just one year, and there's no weekend tech support. Readers responding to our ongoing fax-back survey rate Quantex's service as good—but its reliability as poor. Our Power Desktops Top 20 is now dominated by the likes of Dell, Micron, Gateway, and other top-tier vendors, but Quantex's aggressive pricing manages to earn this PC a solid ranking.

19 **Digital Celebris XL 5120**

NEW THIS MONTH

PROS: Great reliability and service, 17-inch monitor, high-quality Toshiba CD-ROM drive

CONS: High price, so-so Pentium-120 performance, no sound card, no weekend tech support

You won't find the fastest performance in this midsize tower; though it's quicker than most Pentium-100s, this Digital fell a bit short of our expectations for a Pentium-120. What you will find is fine design and superb fit and finish. You'll pay a pricey \$5728 for 16MB of RAM, a 1021MB Seagate SCSI hard drive, a 17-inch monitor, a 2MB Diamond Stealth 64 graphics controller, and a quad-speed Toshiba Enhanced IDE CD-ROM drive.

But as with many corporate PCs, there are no sound features.

Reliability and support are excellent, with a three-year warranty but no weekend tech support. Great reliability and a set of high-quality features will earn this system a place on many corporate desks—but only where generous purchasing budgets rule.



Digital

20 **Compaq Deskpro XL 575**

NEW THIS MONTH

PROS: Good Pentium-75 performance, fine design and construction, top reliability and support

CONS: High price for a Pentium-75

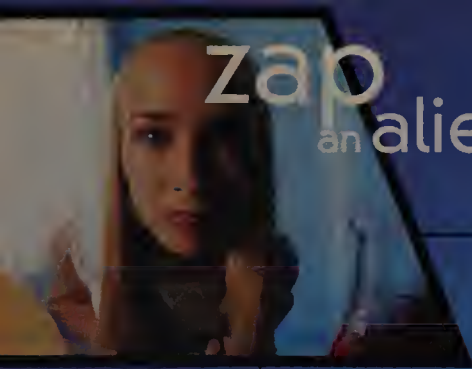
This EISA/PCI bus compact is the sole Pentium-75 left on our power chart. It's the slowest of the power systems—though fast for a Pentium-75—and at \$3949 by far the priciest 75 we've reviewed. The configuration includes 16MB of RAM, a CPU-module design, a 1083MB IBM SCSI hard drive, a 2MB graphics controller, a 15-inch monitor, and an integrated ethernet adapter. The only notable feature missing is a CD-ROM drive.

Our fax-back poll results say Compaq reliability is the best, and support includes a three-year warranty and 24-hour tech support.

This isn't the fastest or cheapest system, but corporate buyers' first demand is for reliable, trouble-free use. Extra compatibility testing and care in assembly adds to the purchase price but often saves cash in troubleshooting and downtime over the life of the machine.



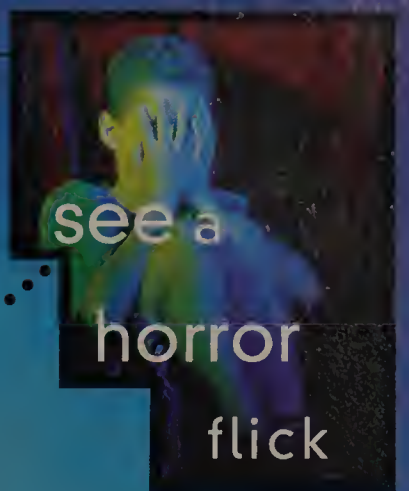
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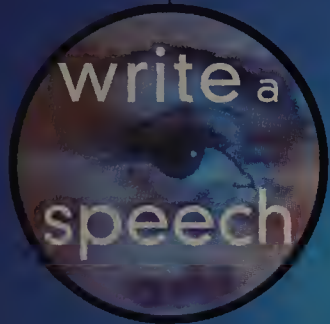
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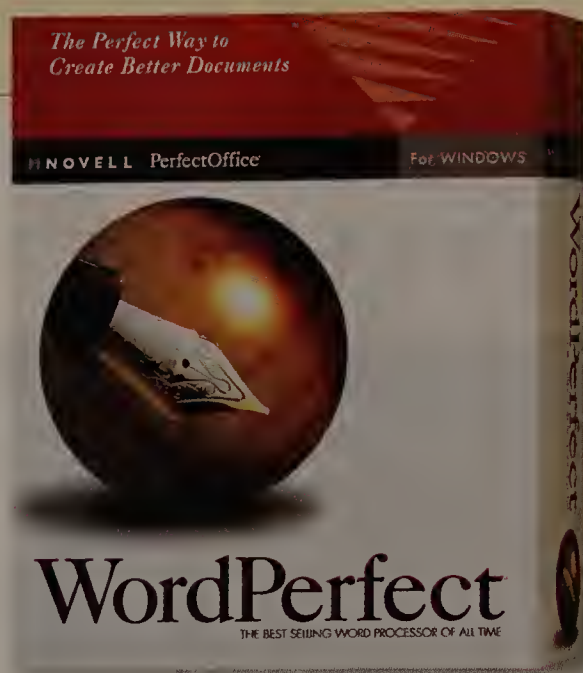
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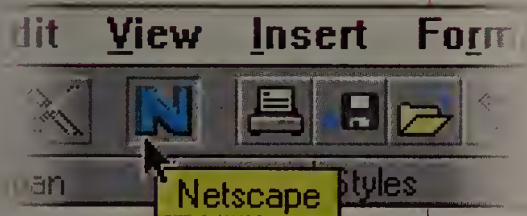
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
THE TOP 20

PC WORLD



BUDGET DESKTOPS

1 Micron 4100 Magnum
Updated DX4-100's a sure winner.

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1  Micron 4100 Magnum	—	1	current	78	70	65/69	\$1999	DX4-100	8	1278
2  Vektron PCI P-75	1	2	July 95	76	74	2	\$1695	Pentium-75	8	852
3  DTK Quin-35M/75	—	1	current	76	70	62/58	\$1890	Pentium-75	8	1083
4  Micron P90 Home MPC	—	1	current	75	74	65/69	\$2198	Pentium-90	8	541
5  Dell Dimension XPS P75	5	4	Mar 95	75	62	71/73	\$2112	Pentium-75	8	545
6 Micro Express MicroFlex-PCI/104	3	2	July 95	74	55	2	\$1599	AmDX4-100	16	540
7 Intelesys Star 75	22	1	May 95	74	67	2	\$1959	Pentium-75	8	850
8 HiQ Mars Station	—	1	current	74	60	2	\$1695	AmDX4-100	8	540
9 Netis N575	6	2	July 95	74	72	2	\$2115	Pentium-75	8	1278
10 PerComp 4100 VIP	7	2	July 95	73	60	2	\$1849	AmDX4-100	8	850
11 Intelesys P5-60	44	5	Dec 94	73	58	2	\$1600	Pentium-60	8	540
12 Diamond DT DX4-100 VP	11	6	Mar 95	73	60	2	\$1575	DX4-100	8	546
13 Micro Express MicroFlex-VL/80	2	6	Mar 95	73	57	2	\$1499	Am486DX2-80	8	425
14 Netis N566	10	3	Mar 95	73	72	2	\$1890	Pentium-66	8	732
15 Gateway 2000 P5-60	8	4	Oct 94	73	62	58/61	\$1999	Pentium-60	8	731
16 Polywell Poly 486-80VB	9	7	Feb 95	73	63	2	\$1695	Am486DX2-80	8	540
17 Austin PowerPlus 75	—	1	May 95	73	69	2	\$2100	Pentium-75	8	850
18 SmartWorks Slimline 66	—	1	current	72	57	2	\$1695	486DX2-66	16	732
19 DFI Diamond 66	12	5	Feb 95	72	50	2	\$1800	486DX2-66	8	540
20 Diamond DT NX90	—	1	current	72	69	2	\$1695	Nx586-P90	8	425



¹ Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews (\$4.95), a single capsule review plus features table

and test report (\$4.95), an entire month's review (\$9.95), and a list of all systems tested by the PC World Test Center (\$4.95). In addition, you can order next month's Top 20 charts and capsule reviews in

2 Vektron PCI P-75
Fastest budget Pentium-75.



4 Micron P90 Home MPC
First-ever budget P-90 Best Buy.




3 DTK Quin-35M/75
Solid all-around Pentium-75.



5 Dell Dimension XPS P75
P-75 is backed by grand support.



CD-ROM drive	Bus slots	Monitor size/dot pitch	Vendor contact number	Fax reprint number ¹	Reader service no.	Comments
4X	ISA, PCI	15"/.28	800/223-6571	3273	656	Newly revised budget champion has full multimedia configuration, fine DX4-100 performance.
—	ISA, PCI	15"/.28	800/725-0026	3257	657	Great price for fast Pentium-75 desktop, but has no CD-ROM drive or sound.
2X	ISA, PCI	15"/.28	800/289-2385	3274	658	Good Pentium-75 performance, attractive price on tower unit with 2X CD-ROM drive.
4X	ISA, PCI	15"/.28	800/223-6571	3275	659	Our first Pentium-90 budget Best Buy comes with a full multimedia configuration. 
4X	ISA, PCI	15"/.28	800/289-3355	3229	660	Budget Pentium-75 from reliable Dell comes with a multimedia configuration.
2X	ISA, PCI	15"/.28	800/989-9900	3258	661	New Best Buys pressure this unit down, despite its nice price and generous RAM.
4X	ISA, PCI	15"/.28	800/577-2486	3276	662	Pentium-75 jumps onto list with a solid configuration and a price drop to below \$2000. 
2X	ISA, PCI ³	15"/.28	800/827-5836	3277	663	AmDX4-100 makes its mark with an ultralow price for an entry-level configuration.
4X	ISA, PCI	15"/.28	800/577-7526	3259	664	Big hard drive and good Pentium-75 performance keep this system on the chart.
2X	ISA, PCI	15"/.28	800/856-6688	3260	665	Solid multimedia-configured AmDX4-100 at a good price, but the CD-ROM drive is just 2X.
—	ISA, PCI	14"/.28	800/577-2486	3169	666	Pentium-60s and 66s are cheap: Get 'em while they last. Small monitor here, though.
—	ISA, PCI	14"/.28	800/989-7253	3211	667	DX4-100 with small monitor is very inexpensive.
—	ISA, VL	15"/.28	800/989-9900	3208	668	Still a fine performer, but this DX2-80 is pushed way down this month by the competition.
—	ISA, PCI	15"/.28	800/577-7526	3214	669	Pentium-66s are inexpensive and won't be available much longer. Still a bargain.
4X	ISA, PCI	15"/.28	800/846-2000	3232	670	Solid business box is likely to follow the path of other Pentium-60s and be off the market soon.
2X	ISA, VL	14"/.28	800/999-1278	3194	671	This DX2-80 with a small monitor is a fast, reasonably priced business starter box.
4X	ISA, PCI	15"/.28	800/849-8681	3278	672	Price drop of over \$350 brings quick, well-configured Pentium-75 onto chart.
—	ISA, VL	15"/.28	800/441-2210	3279	673	Quick, affordable DX2-66 is a basic budget box with no CD-ROM drive or sound.
4X	ISA, PCI	14"/.28	800/808-4334	3238	674	DX2-66 has a small monitor, a multimedia configuration, and a 4X CD-ROM drive. 
—	ISA, VL	14"/.28	800/989-7253	3280	675	Fairly slow system with NexGen CPU has a small hard drive and monitor, lacks CD-ROM drive.

 Recommended as home system

advance (The Top 20 Flash Report, \$9.95; available July 26). Touch-tone phone required. ² Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 100 responses. ³ Also has VL bus slots.

For more information about all products in this table, circle reader service no. 904.

Top 20 Budget Desktops

"BUDGET" USED TO MEAN A 486—BUT NO more. Even within our budget price limit of \$2250, more Pentiums are moving in with the inexpensive DX4-100s, and only four 486s remain. Fully half the PCs on the budget chart this month are Pentiums. The top Best Buy, however, belongs to a \$1999 DX4-100. And no wonder—the Micron 4100 Magnum improves on and replaces a predecessor that lasted a year on our charts and was number one as recently as June. The updated unit has excellent DX4-100 performance, a multimedia configuration, a 1278MB hard drive, and a 15-inch monitor. Nipping at its heels is a pack of Pentiums, including the number two Vektron PCI P-75 at a dirt cheap \$1695. The \$1890 DTK Quin-35M/75 Pentium-75 debuts at number three, and at number four the \$2198 Micron P90 Home MPC is our first Pentium-90 budget Best Buy. New systems from HiQ, SmartWorks, and Diamond also make the chart.

1 Micron 4100 Magnum

NEW THIS MONTH

PROS: Excellent DX4-100 performance, large hard drive, multimedia configuration

CONS: One-year warranty, 32MB RAM limit

The 4100 Magnum is the updated version of an amazingly successful system that debuted in our August 1994 issue. Micron has improved the formula with this new \$1999 PC, remedying most of our complaints with its predecessor. You get a stronger configura-



Micron 4100

tion and performance that's faster, now ranking with that of the best budget systems. With everything it has going for it, the 4100 Magnum takes our top budget Best Buy.

The 4100 Magnum now provides a spacious 1278MB hard drive to go with the 8MB of RAM and 256K of secondary cache. However, the

RAM limit is 32MB—probably sufficient for most budget buyers, but tighter than we'd like. Multimedia components include a quad-speed CD-ROM drive, a sound card, and speakers. Graphics are handled by a 1MB Diamond Stealth 64 DRAM graphics controller matched with a 15-inch ADI monitor (13.7-inch-diagonal viewable screen). This minitower system has three free drive bays

(two externally accessible), one free PCI slot, four free ISA slots, a free PCI or ISA slot, and two free SIMM sockets.

At just one year, Micron's standard desktop warranty is no great shakes. Tech support available 13 hours each weekday and 9 hours on Saturday improves the picture, as does a year of on-site service. You can also purchase optional plans to extend the warranty and on-site service if you like. Micron's overall rating in the most recent results of our fax-back poll is good, with readers giving the company great marks on service and a fair grade on reliability. The bottom line on this PC? It's amazing that you can get a machine that runs this fast and is configured this well for under \$2000.

2



Vektron PCI P-75

REVIEWED: July 1995

PROS: The fastest PC available for under \$2000, good expandability

CONS: Short one-year warranty, no CD-ROM drive

This Vektron's low, low \$1695 price includes a roomy 852MB hard drive, a 2MB 64-bit Stealth PCI card, and a 15-inch monitor. What's the catch? You get just a one-year warranty, and technical support is available during business hours only.

3



DTK Quin-35M/75

NEW THIS MONTH

PROS: Excellent price, good Pentium-75 performance, multimedia configuration

CONS: Crowded motherboard with poor accessibility; no weekend tech support

Despite the recent price drops on Intel CPUs, \$1890 is still a great price on a fast Pentium-75 midsize tower with 8MB of RAM, 256K of secondary cache, a 1083MB hard drive, a 2MB 32-bit PCI graphics controller, and a 15-inch monitor with a 13.6-inch-diagonal viewable screen. With its fine performance, good feature set, and low price, the DTK Quin-35M/75 earns a solid Best Buy. (Note that initial performance was below par. DTK sent us a new hard drive with Windows for Workgroups installed to replace Windows 3.11. We then saw significant improvement. Windows for Workgroups enables use of fast 32-bit file access and will almost always provide better performance than Windows 3.11.)

This PC has some noticeable flaws: The motherboard is obscured by a clutter of cables, making it hard to reach the two free PCI slots. However, access to the one free PCI or ISA slot and the two free ISA slots is easier, and you get six free drive bays.

DTK throws in the Microsoft Entertainment Pack, and you get a sound card and speakers—but the Sony CD-ROM drive is just a double-speed model. The company provides a two-year warranty with one year of on-site service. In our ongoing fax-back survey of readers' experiences with reliability and service, DTK support rates fair overall, with fair reliability and poor service (tech support is available weekdays only). But on a budget machine, a price this low matched with performance this good is enough to overcome the rough edges and earn the DTK Quin-35M/75 a Best Buy.



DTK



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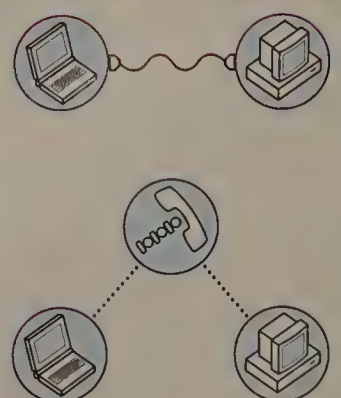
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Micron P90 Home MPC

NEW THIS MONTH

PROS: Reasonable price, solid multimedia configuration, strong performance

CONS: One-year warranty is quite short for a computer today

It had to happen sooner or later—here's our first-ever Pentium-90 budget desktop Best Buy. Amazingly enough, the only features that say "budget" on this \$2198 minitower are the entry-level 8MB of RAM and 541MB hard drive. Otherwise, the Pentium-90 CPU,



Micron P90

256K of secondary cache, 2MB 64-bit Diamond Stealth PCI graphics controller, 15-inch ADI monitor (13.7-inch-diagonal viewable display), quad-speed CD-ROM drive, sound card, and speakers could be found as easily on a power desktop PC. You even get a 14.4-kbps U.S. Robotics internal fax-modem.

This Micron system actually takes the place of the Micron P90 PCI Home MPC reviewed in the January issue. Although this replacement unit's \$200-lower price offers it an entrée into our budget desktops category, the system still provides a near perfect match for the January PC's performance. The software bundle is impressively robust, including Microsoft Office Pro, Quicken Deluxe, and a package of Delrina communications software.

The standard desktop warranty covers a minimal one year, although it is backed by on-site service. You get 13 hours of toll-free tech support Monday through Friday and 9 hours on Saturday. Overall, readers give Micron good marks on support. Granted, this machine doesn't give you all the features of Micron's high-flying power desktops, such as extrafast EDO RAM and the performance-enhancing SyncBurst secondary cache. But any way you slice it, this Micron is an incredible deal.



Dell Dimension XPS P75

REVIEWED: March 1995

PROS: Good basic multimedia configuration, great reliability and service

CONS: One-year warranty on Dimension series PCs, graphics controller has just 1MB of RAM

This \$2112 multimedia minitower features a Pentium-75 processor, 8MB of RAM, a 545MB hard drive, and a 15-inch monitor. Performance was sluggish in our tests; Dell claims it's now better.



Micro Express MicroFlex-PCI/104

REVIEWED: July 1995

PROS: Fantastic price, adequate performance, 16MB of RAM, solid feature set

CONS: Some cable clutter inside case



Intelesys Star 75

REVIEWED: May 1995

PROS: Price drop and beefed-up specs—larger 850MB hard drive, quad-speed CD-ROM drive—move this system onto budget list

CONS: Crowded interior of system is hard to navigate



HiQ Mars Station

NEW THIS MONTH

PROS: Low price is excellent for a DX4-100 system

CONS: Just one free SIMM socket, one-year parts warranty

The HiQ Mars Station owes its ranking on the Budget Desktops Top 20 primarily to its low \$1695 price. This AMD AmDX4-100 system has a budget-basic 8MB of RAM, 256K of secondary cache, and 540MB hard drive. Performance is nimble, and you get a 2MB 64-bit Diamond Stealth 64 DRAM graphics controller and an ADI MicroScan 4GP 15-inch monitor (13.7-inch-diagonal viewable display). However, the system gives you just a double-speed Sony CD-ROM drive, and it lacks sound features.

This is a sturdy PC, and if you're moving up from a VL bus machine, you may be able to use some of your old cards, thanks to the Mars Station's dual VL/PCI bus configuration. (Note that although we had no particular difficulty with this unit, the Test Center has had trouble getting card installations to work on some mixed-bus motherboards in the past.) This PC has one free PCI slot, three free ISA slots, and a free

PCI or VLB slot. You get three free drive bays (one externally accessible). But RAM expandability is not as flexible as we'd like, with just one of two (hard-to-access) SIMM sockets free. If you order the system with 16MB of RAM, make sure HiQ installs it in one high-capacity SIMM to leave some room for expansion.

The documentation for the Mars Station is solid, but you get just a one-year parts warranty (two years on labor). In addition, one year of on-site service is free. Tech support hours are none too generous at just 9 hours per weekday, though you can also call for 5 hours on Saturdays. Many buyers at this affordable price point are willing to compromise on less-than-top-tier support. If you're in that camp, this machine has a lot to offer you.



HiQ



Netis N575

REVIEWED: July 1995

PROS: Fast performance, 1278MB hard drive, quad-speed CD-ROM drive

CONS: Short one-year warranty, documentation is too technical for most users



PerComp 4100 VIP

REVIEWED: July 1995

PROS: Low price, good multimedia bundle, excellent support policies

CONS: Only 1MB of DRAM on the graphics controller, awkward on-screen monitor controls



Intelesys P5-60

REVIEWED: December 1994

PROS: Bare-bones system is dirt cheap at \$1600

CONS: Older system lacks more advanced chip set of newer Pentiums, has 14-inch monitor

12 Diamond DT DX4-100 VIP

REVIEWED: March 1995

PROS: The \$1575 price on this system is unusually low for a DX4-100 computer

CONS: No weekend technical support, small 14-inch monitor, no CD-ROM drive

13 Micro Express MicroFlex-VL/80

REVIEWED: March 1995

PROS: Fast Am486DX2-80 system has a great price, offers very good expandability

CONS: 425MB hard drive is quite small for a desktop PC today, some cable clutter inside case

14 Netis N566

REVIEWED: March 1995

PROS: \$1890 price is very good for a fast Pentium-66 with a 732MB hard drive

CONS: Older system lacks more advanced chip set of newer Pentiums, has one-year warranty

15 Gateway 2000 P5-60

REVIEWED: October 1994

PROS: Good Pentium-60 performance, quad-speed CD-ROM drive, 731MB hard drive

CONS: Older system lacks more advanced chip set of newer, more powerful Pentiums

16 Polywell Poly 486-80VB

REVIEWED: February 1995

PROS: Slightly higher price of \$1695 is still low and now buys 2MB DRAM graphics controller

CONS: A 14-inch monitor is a very small offering today, some cable clutter inside case

17 Austin PowerPlus 75

REVIEWED: May 1995

PROS: Price drop moves this Pentium-75 system with solid performance, 850MB hard drive, and quad-speed CD-ROM drive onto the list

CONS: A bit of cable clutter inside minitower case

18 SmartWorks Slimline 66

NEW THIS MONTH

PROS: Very fast DX2-66 performance, good-quality components

CONS: No weekend tech support, no CD-ROM drive or sound features, only two free drive bays

How times change! As recently as April, about half the contenders on our Budget Desktops Top 20 were DX2-66s; this month, just two remain. With all the high-powered competition, it takes a fine balance of price and performance for any 486 to make our chart. This \$1695 system combines an affordable price with performance you'd expect of an Am486DX2-80. As a result, it hits our chart despite missing a CD-ROM drive, sound card, and speakers.

The fundamental components are of good quality, starting with the Micronics VL/ISA bus motherboard. You get a robust 16MB of RAM, 256K of secondary cache, and a 732MB hard drive. This compact system is sturdy, and cleanly laid out with an integrated 32-bit VL bus drive adapter and a built-in 1MB ATI Mach 64 graphics controller. In addition, you get a 15-inch CTX monitor with a 13.8-

inch-diagonal viewable display.

Three of the four SIMM sockets are free; however, there are only two free drive bays (both externally accessible). One VL slot and four 16-bit ISA slots are free.

SmartWorks' support includes a two-year warranty with a reasonable \$55 option on the first year of on-site service. The documentation is thorough and helpful, but there's no weekend tech support. Most of the systems on our budget desktops chart are PCI/ISA bus machines with faster processors and at least CD-ROM drives. Still, this quick, affordable, and well-made DX2-66 is a worthy basic budget value.



SmartWorks

19 DFI Diamond 66

REVIEWED: February 1995

PROS: Solid multimedia configuration, 14.4-kbps modem, decent 486DX2-66 performance

CONS: No toll-free technical support, \$1800 price is a little high for a basic DX2-66

20 Diamond DT NX90

NEW THIS MONTH

PROS: The \$1695 price is excellent for a system with a NexGen Nx586-P90 CPU

CONS: Fairly slow Nx586-P90 performance, small hard drive and monitor, no CD-ROM drive, one-year warranty

Today's graphics-oriented apps demand a powerful CPU, even in an entry-level setting. The Diamond DT NX90 uses a NexGen Nx586-P90 processor that should put it firmly in the range of Pentium performance—at a price of just \$1695. Don't expect too much, however. The Nx586-P90 CPU competes well with Pen-



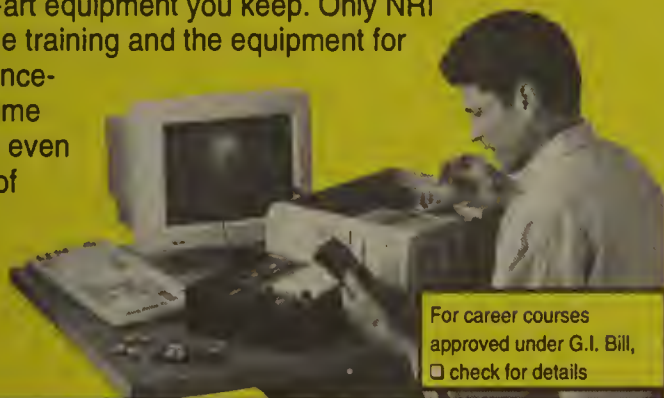
Diamond

tium-90s in many PCs, but this compact turned in scores more typical of a Pentium-75. The minimal configuration is a contributing factor: You'll probably like the performance more if you upgrade the 8MB of RAM to 16MB, using two of the four free SIMM sockets. The 425MB hard drive and 14-inch monitor are minimal at best, however, and quite pricey to upgrade after purchase. Before buying this unit, price it with a larger hard drive and monitor. The bare-bones approach also applies to a CD-ROM drive and sound, neither of which is included.

The DT NX90 does give you three free externally accessible drive bays and five free ISA slots. Both VL bus slots are filled—one with a 1MB DRAM graphics board and one with an Enhanced IDE drive adapter. Documentation is adequate but consists of basic component manuals that may perplex new users. Diamond offers a brief one-year on-site service warranty for \$30 and no weekend tech support. This system does have potential, especially if you're willing to add to the basic configuration.

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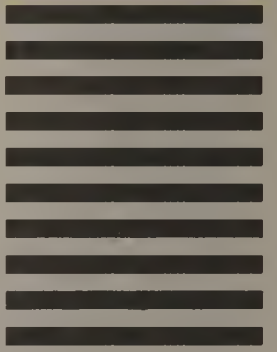


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THE TOP 20

PC WORLD



NOTEBOOK PCs

1 Toshiba T4900CT
Fast, classy Pentium-75.

POWER SYSTEMS

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Toshiba T4900CT	2	6	Mar 95	97	54	80/74	\$5999	Pentium-75	8	810
2 AST Ascentia 910N	4	5	Apr 95	96	42	3	\$3899	DX4-75	8	510
3 Gateway 2000 Liberty DX4-100	1	2	July 95	95	54	3	\$2979	DX4-100	8	352
4 Gateway 2000 ColorBook2	—	1	current	95	58	3	\$4399	DX4-100	24	720
5 Compaq LTE Elite 4/75 CXL	—	1	current	94	38	83/83	\$5699	DX4-75	8	810
6 WinBook XP DX4-100 8/520 TFT	8	3	June 95	94	48	3	\$3679	DX4-100	8	810
7 Toshiba Satellite Pro T2150CDT	5	2	July 95	93	48	80/74	\$5199	DX4-75	8	500
8 Dell Latitude XP 4100CX	7	5	Apr 95	93	42	3	\$4199	DX4-100	8	340
9 NEC Versa P/75	13	2	June 95	92	64	3	\$5140	Pentium-75	8	540
10 IBM ThinkPad 755CE	9	4	Apr 95	92	48	78/77	\$6634	DX4-100	8	540

BUDGET SYSTEMS

1 WinBook XP SX-33 Monochrome	1	4	May 95	93	27	3	\$1659	486SX-33	8	260
2 WinBook XP DX2-50 Monochrome	2	7	Feb 95	92	28	3	\$1799	486DX2-50	8	260
3 Dell Latitude 450C	4	5	Jan 95	90	30	3	\$2699	486DX2-50	8	523
4 Dell Latitude 475C	5	4	May 95	90	41	3	\$2599	DX4-75	8	340
5 Acom Patriot 4000 DX4-100	6	4	May 95	90	45	3	\$2435	DX4-100	8	520
6 MPC TouchNote 700	3	2	July 95	90	33	3	\$2345	DX4-75	8	528
7 Austin Business Audio 4/75	7	7	Feb 95	87	36	3	\$2279	DX4-75	8	250
8 Acom Patriot 4000 DX2-66	8	6	Mar 95	86	35	3	\$1990	486DX2-66	8	344
9 Sceptre Soundx Series 1000 DX2-66	9	4	May 95	86	37	3	\$1775	486DX2-66	8	340
10 CTX EzBook	11	4	Mar 95	84	28	3	\$1958	486DX2-50	8	341



¹ CA = color active, CD = color dual-scan, CP = color passive, MD = mono dual-scan, MP = mono passive. ² Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for phone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews (\$4.95), a single capsule review plus features table and test report (\$4.95), an entire month's review (\$9.95), and a list of all systems tested by the PC World Test Center (\$4.95).

2 **AST Ascentia 910N**
This DX4-75 is priced right.



2 **WinBook XP DX2-50 Monochrome**
Cheap price, long battery life.



1 **WinBook XP SX-33 Monochrome**
Mono note has top battery life.



Weight (pounds)	Battery life (hours)	Screen type/size	Vendor contact number	Fax reprint number ²	Reader service no.	Comments
7.6	3:57	CA/10.4"	800/334-3445	3677	676	Price has dropped about \$1500 in the last two months on this deluxe unit.
7	7:55	CA/10.4"	800/876-4278	3683	677	Excellent business traveler with three-year warranty, great battery life, reasonable price.
6.6	6:47	CD/10.4"	800/846-2000	3700	678	Solid dual-scan color model with excellent performance, light weight, fine battery life.
6.8	5:16	CP/10.3"	800/846-2000	3703	679	Great performance on passive color model with big hard drive and maxed-out RAM.
7.2	7:15	CA/10.3"	800/345-1518	3704	680	Retested DX4-75 has big hard drive and super battery life, but it's slow for a power note.
7.6	3:27	CA/9.4"	800/468-2162	3696	681	Steady player has a big hard drive, reasonable price, so-so battery life.
8.8	5:20	CA/10.4"	800/334-3445	3701	682	Multimedia note includes 2X CD-ROM drive, 16-bit sound, and 65,536-color screen.
7.4	6:46	CA/9.5"	800/289-3355	3685	683	Excellent, well-designed package; reasonable price; durable lithium-ion battery.
8.8	3:26	CA/9.6"	800/632-4636	3698	684	Fast but heavy high-class Pentium note has one of the first 800 by 600 screens.
7.4	3:33	CA/10.4"	800/426-2968	3687	—	IBM quality in a classy note with Black Matrix screen that's easily viewable in bright light.
6.8	8:45	MP/9.5"	800/468-2162	3692	685	Mono unit has the best battery life we've seen; light weight, low price, small hard drive.
6.8	6:46	MP/9.5"	800/468-2162	3673	686	Monochrome note with low price, excellent battery life, good features, but small hard drive.
7	3:13	CD/9.5"	800/289-3355	3689	687	Top-rated color budget notebook has a large hard drive and a reasonable price.
7.2	3:16	CD/9.5"	800/289-3355	3693	688	Faster than its third-ranked budget sibling. Costs a bit less and has a smaller hard drive.
8.4	2:47	CD/10.3"	800/898-2665	3694	689	Fastest budget note has a reasonable price, but it's a bit heavy, and battery life is short.
7.6	4:53	CD/9.4"	800/672-8088	3702	690	Good balance of speed, solid battery life, ample hard drive in DX4-75 budget note.
8.2	3:57	CD/9.5"	800/849-8681	3676	691	Nice audio features and a great price, but the hard drive is quite small.
8.4	3:30	CP/10.3"	800/898-2665	3682	692	Good price on DX2-66 passive color notebook. Fairly heavy.
7.8	2:28	CD/10.3"	800/788-2878	3695	693	Ultra-affordable color note has good audio features but poor battery life.
7.2	4:25	MP/9.5"	800/888-9052	3680	694	Basic mono notebook has an attractive price, good basic features.

You can also order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, \$9.95; available July 26). Touch-tone phone required. ³ Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 100 responses.

For more information about all products in this table, circle reader service no. 905.

Top 20 Notebooks

NOT QUITE ALL IS QUIET ON THE NOTEBOOKS front. There's been some reshuffling, with price drops strengthening the hands of major players. Our top power Best Buy, Toshiba's T4900CT, has benefited from reductions of about \$1500 in the last two months. And the number two AST Ascentia 910N is now priced at a tempting \$3899. The new Gateway ColorBook2's fast performance, 24MB of RAM, and 720MB hard drive make it a fine buy at \$4399. Compaq resubmitted its updated veteran, the LTE Elite 4/75 CXL; a great battery life and fantastic support earn it a solid spot on the chart. As usual, the budget category shows less change: WinBook's XP SX-33 and DX2-50 Monochrome models have enjoyed a solid run at or near the top.

Power Notebooks

1 Toshiba T4900CT

REVIEWED: March 1995

PROS: Great performance, large color screen, giant hard disk, three-year warranty

CONS: Despite reductions, this computer is still one of the highest-priced notebooks available. Hot-performing 7.6-pound Pentium-75 world-class notebook has 8MB of RAM, an 810MB hard drive, a brilliant 10.4-inch color-active screen, 65,536 simultaneous colors, a near 4-hour battery life, 24-hour tech support, and a price that's still high at \$5999.

2 AST Ascentia 910N

REVIEWED: April 1995

PROS: Near 8-hour battery life, lithium-ion battery, small and light, three-year warranty

CONS: Some looseness in the screen hinge

Continued price drops make this quick DX4-75 system an even better power buy, moving it up in the rankings since last month. The 10.4-inch active-matrix color screen is excellent, and the 510MB hard drive is roomy. AST's 24-hour tech support is always there for you. We noted some screen hinge looseness on our test unit, but this model is an outstanding choice for under \$4000.

3 Gateway 2000 Liberty DX4-100

REVIEWED: July 1995

PROS: Fast DX4-100 performance, battery life near 7 hours, light 6.6-pound weight

CONS: One-year warranty, dull screen, right-handed pointing device can be awkward

4 Gateway 2000 ColorBook2

NEW THIS MONTH

PROS: Super DX4-100 performance, very good battery life, 24MB of RAM

CONS: One-year warranty, passive color screen

This note came with a maxed-out 24MB of RAM, contributing to its high \$4399 price but providing better performance when task-switching RAM-hungry apps and large data files. Our test unit needed replacement of its 720MB hard disk and adjustments to Windows and the disk cache before it could make it through our tests. Performance Analyst Dave Casini reports good end results, however: The ColorBook2 beat every DX4-100 note we've tested. But the 10.3-inch passive display lacks the crisp viewability of active-matrix screens.



Gateway

The 6.8-pound system is sturdy, and the NiMH battery lasted 5.3 hours in our test. The keyboard action is a bit soft for our taste, but we liked the minijoystick pointing device. Gateway's one-year notebook warranty is just so-so. Passive color is a compromise for power users, but this fast, RAM-loaded note is still a fine value.

5 Compaq LTE Elite 4/75 CXL

NEW THIS MONTH

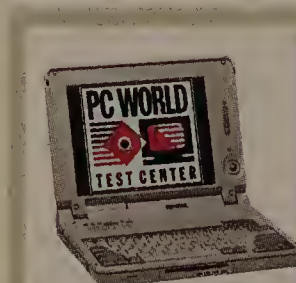
PROS: Superb service and reliability; great design, screen, and battery life

CONS: Relatively slow performance for a pricey DX4-75 power note

When we first reviewed this model last October, it was a snappy performer. The unit is still on the market, and it's time for a second look. Clearly, the LTE Elite 4/75 CXL's *features* have stood the test of time. Only the performance seems dated: Two other DX4-75s currently on our notebook power chart are significantly faster, and the pricey \$5699 LTE Elite is the slowest in this section.

Otherwise, we have few complaints: You get 8MB of RAM, a jumbo 810MB hard drive, and a PC Card Type III slot. The NiMH battery tested out with a fantastic 7.3-hour battery life. And the 10.3-inch active-matrix color screen is crisp and bright.

Portability is super on this 7.2-pound unit; there's no external power supply to pack. Furthermore, the integrated trackball, which is mounted to the right of the screen, is easy to use (as long as you're right-handed). Compaq's reliability is absolutely top-drawer, and you get a three-year warranty and 24-hour tech support. Although this system's performance is nowhere near the top—even of the DX4-75s—the LTE Elite's fine points make it a shoo-in for our power notebooks chart.



Compaq

6 WinBook XP DX4-100 8/520 TFT

REVIEWED: June 1995

PROS: Very fast, sturdy design, crisp display, 810MB hard drive, 14.4-kbps fax-modem

CONS: The one-year warranty is short these days, even for a notebook computer

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7 Toshiba Satellite Pro T2150CDT

REVIEWED: July 1995

PROS: Excellent performance, built-in CD-ROM drive, integrated audio, long battery life
CONS: Expensive, heavy, awkward battery-swapping method, brightness control is hard to find

8 Dell Latitude XP 4100CX

REVIEWED: April 1995

PROS: Outstanding design, lithium-ion battery with long 6.8-hour life, great three-year warranty
CONS: A number of our readers report long waits on hold after dialing in on sales lines

9 NEC Versa P/75

REVIEWED: June 1995

PROS: Excellent performance, high-resolution 800 by 600 color display, three-year warranty
CONS: Pricey, heavy, no weekend tech support, limited power management settings

10 IBM ThinkPad 755CE

REVIEWED: April 1995

PROS: Strong performance, built-in CD-ROM drive, color-rich screen, lots of extras
CONS: Price is very high on this classy unit

Budget Notebooks

1 WinBook XP SX-33 Monochrome

REVIEWED: May 1995

PROS: Attractive price, 8.8-hour battery life, light 6.8-pound weight, 14.4-kbps fax-modem
CONS: One-year warranty, small 260MB hard drive, no battery hot-swapping
 New low \$1659 price and the best battery life yet. Monochrome note's pluses outweigh the small hard drive and short warranty.

2 WinBook XP DX2-50 Monochrome

REVIEWED: February 1995

PROS: Long 6.8-hour battery life, light 6.8-pound weight, low price, 14.4-kbps fax-modem
CONS: One-year warranty, small 260MB hard drive, no battery hot-swapping
 Price cut to \$1799 makes this monochrome system a Best Buy again. Long 6.8-hour battery life and low 6.8-pound weight make up for the small 260MB hard drive and short one-year warranty.

3 Dell Latitude 450C

REVIEWED: January 1995

PROS: Fast for a DX2-50, 7-pound weight, 523MB hard drive, fax-modem, price drop to \$2699
CONS: One-year warranty is minimal coverage today, even on notebook systems

4 Dell Latitude 475C

REVIEWED: May 1995

PROS: Solid DX4-75 performance, 24-hour tech support, price cut to \$2599
CONS: One-year warranty is minimal coverage today, even on notebook systems

5 Acom Patriot 4000 DX4-100

REVIEWED: May 1995

PROS: Fine performance, large dual-scan color screen, 14.4-kbps fax-modem, good price
CONS: Short 2.8-hour battery life, hefty 8.4-pound traveling weight, short one-year warranty

6 MPC TouchNote 700

REVIEWED: July 1995

PROS: Great price, solid battery life, convenient touchpad pointing device, good built-in sound
CONS: Subpar support policies

7 Austin Business Audio 4/75

REVIEWED: February 1995

PROS: Great price, decent DX4-75 performance, audio, 24-hour tech support
CONS: One-year warranty, 8.2-pound traveling weight, limited power management

8 Acom Patriot 4000 DX2-66

REVIEWED: March 1995

PROS: Great performance, large hard drive, built-in audio
CONS: Dull screen colors, heavy weight, no established turnaround time for repairs

9 Sceptre Soundx Series 1000 DX2-66

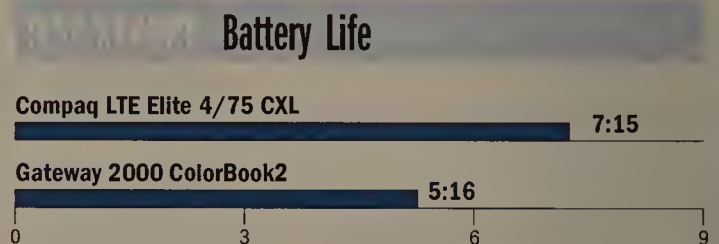
REVIEWED: May 1995

PROS: Fast for a DX2-66 notebook, low price, large color screen, integrated audio
CONS: Short battery life, poor display quality, brief one-year warranty, short tech support hours

10 CTX EzBook

REVIEWED: March 1995

PROS: Attractive price, great battery life
CONS: Nonstandard connector for external monitor, no weekend technical support



Time in hours:minutes.

Methodology

We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



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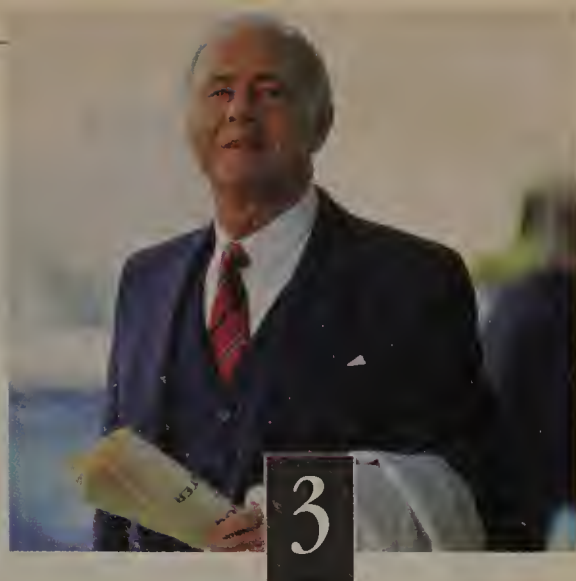
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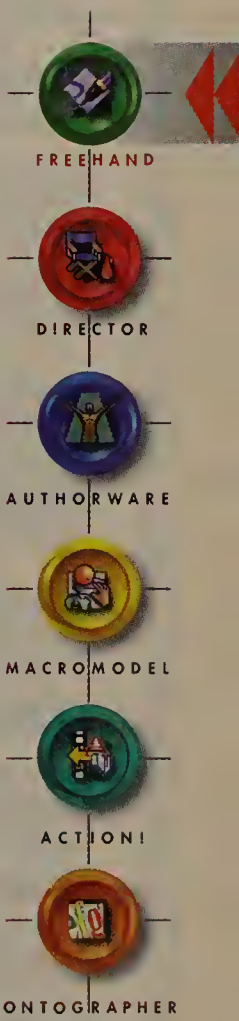
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This Month's Contenders—Desktops

● = Yes ○ = No

n/a = not applicable



Standard features	Compaq Deskpro XL 575	Dell Dimension XPS P100c	Dell Dimension XPS P133c	Diamond DT NX90	Digital Celebris XL 5120	DTK Quin-35M/75
Street price as of 4/25/95 ¹	\$3949	\$3178	\$3999	\$1695	\$5728	\$1890
CPU	Pentium-75	Pentium-100	Pentium-133	Nx586-P90	Pentium-120	Pentium-75
CPU or upgrade socket	320-pin ZIF	320-pin ZIF	320-pin ZIF	463-pin ZIF	320-pin ZIF	320-pin ZIF
BIOS	Compaq 1/20/95	AMI 3/21/95	AMI v. 1.00.02	AMI 11/11/92	Phoenix 2/14/95	Award 2/9/95
Installed/maximum RAM (MB)	16/128	16/128	16/128	8/192	16/384	8/128
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin
SIMM sockets/number free	4/4	4/2	4/2	6/4	6/4	4/2
Secondary RAM cache installed/maximum (K)	256/256	256/256	512/512	256/256	256/256	256/1024
Case style	compact	minitower	minitower	compact	tower	tower
Free externally accessible 3½-inch/5¼-inch drive bays	0/2	0/2	0/2	0/3	0/1	1/2
Free internal 3½-inch/5¼-inch drive bays	0/0	1/0	1/0	0/0	1/0	3/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	4/0/0 ²	0/4/0 ³	0/2/0 ³	0/5/0	0/4/0 ³	0/3/0 ³
PCI or VL bus slots/number free	2 PCI/1 ²	4 PCI/3 ³	4 PCI/3 ³	2 VL/0	3 PCI/2 ³	4 PCI/3 ³
Hard disk	IBM DPES 31080	Seagate ST31220A	Quantum Fireball 1080A	Quantum LPS420A	Seagate Hawk 2 LP ST31230N	Seagate ST31220A
Size (MB)	1083	1083	1080	425	1021	1083
Adapter	integrated	integrated	integrated	OEM 32-bit VLB	integrated	integrated
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44	1.44
Graphics adapter	Compaq QVision 2000	Number Nine FX Motion 771	Number Nine FX Motion 771	Genoa 8500 VL	Diamond Stealth 64 VRAM	Cardex ET4000/W32P
Installed VRAM/DRAM (MB)	2/0	2/0	2/0	0/1	2/0	0/2
Monitor	Compaq 151FS	Dell D1728-LS	Dell UltraScan 17ES	Impression 3428 NG	Digital PCXBV-KA	DTK SM-5515G
Tube/viewable area (diagonal inches)	15/14	17/15.6	17/16	14/12.8	17/16.1	15/13.6
Dot pitch (mm)	.28	.28	.28	.28	.28	.28
Modem speed for fax/data (kbps)	n/a	n/a	14.4/28.8	n/a	n/a	n/a
Sound board	integrated 16-bit	n/a	Sound Blaster AWE32	n/a	n/a	OEM 16-bit
CD-ROM drive	n/a	Mitsumi CRMC-FX400	Mitsumi CRMC-FX400	n/a	Toshiba XM 5201 B	Sony CDU55E
Data transfer rate (K/sec)	n/a	600	600	n/a	600	300
Parallel/serial/mouse/SCSI ports	1/2/1/1	1/2/1/0	1/2/1/0	1/2/0/0	1/2/1/1	1/2/0/0

Service and support

Warranty (years)	3	1	1	1	3	2
30-day money-back guarantee	●	●	●	●	●	○
On-site service first-year price	free	free	free	\$30	free	free
Repair turnaround policy (days)	2	7	7	2	2	2
Daily toll-free phone support (hours)	24	24	24	9	11.5	9
Weekend support	●	●	●	○	○	○
BBS	●	●	●	●	●	●
Fax	●	●	●	●	●	●



¹ All systems priced as configured with DOS 6.0 or later version, Windows 3.1, VGA and color monitor, keyboard, and mouse or other pointing device. Price is direct or based on vendor estimate.

² One less EISA slot available when all PCI slots are filled, and vice versa.

³ One less 16-bit slot available when all PCI slots are filled, and vice versa.



Gateway 2000 P5-133XL	HiQ Mars Station	Micron 4100 Magnum	Micron P90 Home MPC	Micron P100 Millennia	Micron P133 Millennia	Quantex QP5/100 XM-4	SmartWorks Slimline 66
\$4399	\$1695	\$1999	\$2198	\$3069	\$4399	\$2899	\$1695
Pentium-133	AmDX4-100	DX4-100	Pentium-90	Pentium-100	Pentium-133	Pentium-100	486DX2-66
320-pin ZIF	237-pin ZIF	237-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	237-pin ZIF
AMI 3/6/95	Award 11/23/94	Phoenix 4/19/90	Phoenix 3/14/95	Phoenix v4.04	Phoenix 5/3/95	Award 1/24/95 Plug and Play	Phoenix 1/15/88
16/128	8/128	8/32	8/128	16/128	16/128	16/128	16/64
72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin
4/2	2/1	4/2	4/2	4/2	4/2	4/2	4/3
256/256	256/512	256/256	256/512	256/256	256/256	256/1024	256/256
tower	compact	minitower	minitower	minitower	minitower	tower	compact
0/3	0/1	0/2	0/2	0/2	0/2	0/3	0/2
3/0	2/0	1/0	1/0	1/0	1/0	4/1	0/0
0/1/0 ³	0/3/0	0/5/0 ³	0/4/0 ³	0/3/0 ³	0/2/0 ³	0/2/0 ³	0/4/0
4 PCI/3 ³	3 PCI/2, 1 VL/1 ⁴	3 PCI/2 ³	3 PCI/2 ³	4 PCI/3 ³	4 PCI/3 ³	4 PCI/2 ³	1 VL/1
WD Caviar 31600	WD Caviar 2540	Conner CFA1275A	Conner CFS540R	Conner CFA1275A	WD Caviar 31600	WD Caviar 31200	Quantum Lightning 730A
1624	540	1278	541	1278	1624	1200	732
integrated	integrated	integrated	integrated	integrated	integrated	Promise GA-107A EIDE	integrated
1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
ATI GX Mach 64	Diamond Stealth 64 DRAM	Diamond Stealth 64 DRAM	Diamond Stealth 64 DRAM	Diamond Stealth 64 VRAM	Diamond Stealth 64 VRAM	Quantex 64-bit	integrated ATI Mach 64
0/2	0/2	0/1	0/2	2/0	2/0	0/2	0/1
Gateway Vivitron 1776	ADI MicroScan 4GP	ADI MicroScan 4V	ADI MicroScan 4V	ADI MicroScan 4V	ADI MicroScan 4V	Mag DX17F	CTX 1565GM
17/16	15/13.7	15/13.7	15/13.7	15/13.7	15/13.7	17/15.9	15/13.8
.25	.28	.28	.28	.28	.28	.26	.28
14.4/14.4	n/a	n/a	14.4/14.4	n/a	n/a	14.4/14.4	n/a
Ensoniq Soundscape Wavetable	n/a	Creative Labs Sound Blaster 16	Creative Labs Sound Blaster 16	Creative Labs Sound Blaster 16	Creative Labs Sound Blaster 16	OEM 16-bit	n/a
Sanyo CDR-C3G	Sony CDU55E	Sony CDU76E	Sony CDU76E	Sony CDU76E	Plexor 6Plex PX-63CS	Toshiba 5302B	n/a
600	300	648	648	648	900	600	n/a
1/2/1/0	1/2/0/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/1/1	1/2/0/0	1/2/1/0
1 ⁵	2 ⁶	1	1	1	1	1	2
●	●	●	●	●	●	●	●
free	free	free	free	free	free	free	\$55
○	1	2	2	2	2	1	2
18	9	13	13	13	13	11	10
● ⁷	● ⁷	● ⁷	● ⁷	● ⁷	● ⁷	○	○
●	○	●	●	●	●	●	○
●	●	●	●	●	●	●	○

⁴ One less PCI slot available when VL slot is filled, and vice versa.

⁶ One year parts, two years labor.

⁵ Three years parts, one year labor.

⁷ Saturdays only.

This Month's Contenders—Notebooks

● = Yes ○ = No

n/a = not applicable

Standard features	Compaq LTE Elite 4/75 CXL	Gateway 2000 ColorBook2
Street price as of 4/25/95 ¹	\$5699	\$4399
CPU	DX4-75	DX4-100
Traveling weight (pounds) ²	7.2	6.8
Width x depth x height (inches)	11.6 x 8.8 x 2.1	11.8 x 8.5 x 1.8
Installed/maximum RAM (MB)	8/24	24/24
Secondary RAM cache installed/maximum (K)	256/256	0/0
Installed/maximum hard disk (MB)	810/1000	720/720
Removable hard disk	●	●
Display type	color active	color passive
Screen diagonal (inches)	10.3	10.3
Maximum colors or gray shades of LCD	256	256
Simultaneous LCD and external monitor	●	●
Highest resolution of external monitor	1024 x 768	1024 x 768
Mouse/keyboard ports	1/0 ³	1/0 ³
Cursor keys in inverted T	●	●
Dedicated page-control keys	○	●
All 12 function keys dedicated	●	●
Standard <Ctrl> and <Alt> layout	●	○
Built-in pointing device	●	●
Modem speed for fax/data (kilobits per second)	n/a	n/a
Docking station available	●	○
PC Card (PCMCIA) slot Type II/III	0/1 ⁴	0/1 ⁴

Power management

Supports APM	●	●
Type of battery	NIMH	NIMH
Suspend button	●	●
Suspends when case closed	○	●

Service and support

Warranty (years)	3	1
30-day money-back guarantee	● ⁵	●
On-site/replacement service first-year price	○	○
Repair turnaround policy (days)	2	○
Daily toll-free phone support (hours)	24	18
Weekend support	●	● ⁶
BBS	●	●
Fax	●	●

¹ All notebooks priced as configured with DOS 6.0 or later version, Windows 3.1, VGA monochrome or better display, and mouse or other pointing device. Price is direct or based on vendor estimate.

² Includes computer, adapter, power cord, and external floppy drive if notebook has one.

³ Mouse port doubles as keyboard port.

⁴ Type III slot alternatively holds two Type II devices.

⁵ If system is purchased through Compaq DirectPlus.

⁶ Saturdays only.

System Snapshots

These desktops and notebooks were tested and reviewed along with the others, but didn't score high enough to reach the Top 20 charts.

Alaris Leopard VIP BL-100

PROS: Great price, good expandability, three-year warranty

CONS: Slow performance, no CD-ROM drive

Based on the 100-MHz IBM Blue Lightning CPU, this PC has 16MB of RAM and a 530MB hard drive. Plenty of slots and bays are available for expansion, but the system's minimal configuration keeps it off the charts. \$1900. *Alaris, Inc.*, 800/317-2348, 510/770-5700 **Reader service no. 617**

Aspen Aspenta 90

PROS: Excellent performance, large display

CONS: 8.8-pound weight, one-year warranty

This fast Pentium-90 note has a 10.1-inch dual-scan color screen, 8MB of RAM, and a 528MB hard drive. But its battery life is less than 3 hours, and its port covers are flimsy (one actually broke during testing). \$3350. *Aspen Computer, Inc.*, 800/472-3273, 716/626-0315 **Reader service no. 618**

AT&T Globalyst 250P

PROS: Very fast, hefty helping of RAM, strong service package

CONS: High price, heavy 9-pound traveling weight

This Pentium-75 unit has 20MB of RAM, an 810MB hard drive, and a nice 10.5-inch active-matrix color screen. But its 3.3-hour battery life is so-so, and it weighs heavily on both wallet and shoulder. \$6942. *AT&T Global Information Solutions*, 800/447-1124, 513/445-5000 **Reader service no. 619**

Blackship BLK P-100 Nautilus

PROS: Quad-speed Toshiba CD-ROM drive, large hard drive

CONS: So-so performance for a high price, one-year warranty

Pentium-100 PC with 16MB of RAM performed slowly compared to its peers. The crowded compact case includes a 1062MB SCSI hard drive, high-quality Toshiba SCSI CD-ROM drive, and 28.8-kbps fax-modem. You also get a bundle of CD-ROM games and reference works. \$3675. *Blackship Computer Systems, Inc.*, 800/531-7447, 408/432-7500 **Reader service no. 620**

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Cleanup Coach	✓	No
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Emergency Recovery Disk	✓	No
Automatic Installation Logging	✓	Limited

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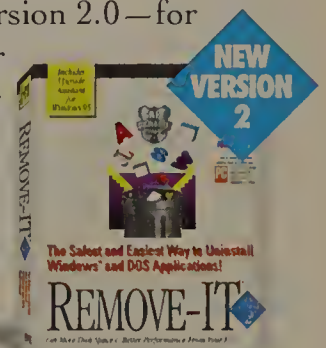


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PROS: Top notebook performance, lots of RAM, 810MB drive
CONS: Heavy, one-year warranty, no toll-free tech support
 Pentium-90 notebook has 24MB of RAM, 256K secondary cache, and 9.3-inch color-active screen. But at 9.2 pounds, with a 3.4-hour battery life and meager support offerings, it misses the power notebook mark. \$4180. *Broadax Systems, Inc.*, 800/872-4547, 818/442-0020 **Reader service no. 621**

Gateway 2000 P5-75

PROS: Three-year warranty, quad-speed CD-ROM drive
CONS: No specified repair turnaround policy
 Compact performs well for a Pentium-75; its 16MB of EDO RAM mitigates the lack of a secondary cache. With a 731MB hard drive, 15-inch Trinitron monitor, and quad-speed CD-ROM drive, this would make a good budget system if its price were lower. \$2399. *Gateway 2000, Inc.*, 800/846-2000, 605/232-2000 **Reader service no. 622**

Intelesys Stargate Pro 75

PROS: Fast for a Pentium-75, three-year labor warranty
CONS: Expensive, parts warranty covers just one year
 Pentium-75 minitower has 16MB of RAM, a 1083MB hard drive, multifunction card with 14.4-kbps fax-modem and sound, 4X CD-ROM drive. But this fine performer is too pricey. \$2899. *Intelesys, Inc.*, 800/577-2486, 510/226-0200 **Reader service no. 623**

Maximus WinMax NX586/90

PROS: NexGen CPU performs well against Intel Pentium-90s
CONS: Pricey for a minimal configuration, one-year warranty
 Minitower has a fast Nx586-P90 CPU, 16MB of RAM, an 850MB hard drive, and a quad-speed CD-ROM drive. It misses a power ranking, however, because of its ho-hum configuration and service policies. \$2360. *Maximus Computers, Inc.*, 800/888-6294, 818/305-5925 **Reader service no. 624**

MidWest Micro P5-120 Office PC

PROS: Very fast, three-year warranty, 17-inch monitor
CONS: Skippy service package, high price
 Midsize tower Pentium-120 is one of the fastest we've tested. Has 16MB of EDO RAM, a 1083MB IBM hard drive, and a

solid multimedia configuration. But with no on-site service plan or specified turnaround repair policy, it misses the power chart. \$4265. *MidWest Micro, Inc.*, 800/728-8582, 513/368-2309 **Reader service no. 625**

MIS 54PE/90

PROS: Solid performer, system can accept a second CPU
CONS: High price, no CD-ROM drive, one-year warranty
 Pentium-90 tower with solid performance includes 16MB of RAM, a 1083MB hard drive, and a 2MB PCI graphics controller with a 17-inch monitor. One-year warranty mars otherwise decent support policies, however, and you can get more for the price. \$3615. *MIS Computer*, 800/989-9902, 714/852-1402 **Reader service no. 626**

Packard Bell Multimedia Pentium 75

PROS: Large hard drive, two CD-ROM drives, CD-ROM bundle
CONS: Slow, poor service and reliability, one-year warranty
 This slow Pentium-75 has 16MB of EDO RAM, a 1278MB hard drive, a 14.4-kbps fax-modem. Readers responding to our ongoing fax-back poll give the company poor marks on service and reliability. \$2899. *Packard Bell Electronics, Inc.*, 800/733-5858, 818/865-1555 **Reader service no. 627**

PerComp Executive Series Pentium 75MHz

PROS: Three-year warranty, 24-hour tech support
CONS: Sketchy documentation
 Pentium-75 full tower comes with 16MB of RAM, an 853MB hard drive, and a multimedia configuration. Had this decent performer cost about \$300 less, it would have hit the Budget Top 20 chart. \$2449. *PerComp Microsystems, Inc.*, 800/856-6688, 214/231-2713 **Reader service no. 628**

Robotech Cobra RS p100

PROS: Very good performance, 17-inch monitor
CONS: Price is on the high side
 Pentium-100 midsize tower has 16MB of RAM, a 1083MB hard drive, Teac 4X CD-ROM drive. A solid but somewhat pricey system. Teac 4X CD-ROM drives have performed slower than other 4X drives in our tests. \$3899. *Robotech, Inc.*, 800/533-0633, 801/565-0645 **Reader service no. 629**

Unisys PW2 Advantage Series Model CWP 5906

PROS: 17-inch monitor, all expansion slots free
CONS: High price for a minimally configured Pentium-90
 Pentium-90 desktop has 8MB of RAM, a 528MB hard drive, and a big 17-inch monitor. The price is high, and it lacks multimedia components. \$3540. *Unisys Corp.*, 800/448-1424 **Reader service no. 630**

Unisys PW2 Advantage Series Model SVI 5907

PROS: High-quality parts including Toshiba 4X CD-ROM drive
CONS: Corporate power system is very expensive
 Pentium-90 tower comes with 16MB of RAM, a 1052MB hard drive, 17-inch monitor, and SCSI CD-ROM drive, plus plenty of free slots and bays. Performance is fine, but the price is very high. \$5086. *Unisys Corp.*, 800/448-1424 **Reader service no. 631**

Unisys PW2 Travel Asset Notebook DX4-75

PROS: Very good DX4-75 performance
CONS: Poor 2.3-hour battery life is way too short
 This 7.4-pound DX4-75 notebook has just the basics: 8MB of RAM, a small 340MB hard drive, and a 9.4-inch color-active screen. It's a lackluster power note contender with poor battery life. \$4135. *Unisys Corp.*, 800/448-1424 **Reader service no. 632**

USA Flex 75 MHz Custom Pentium System

PROS: Three-year warranty, full multimedia setup
CONS: A bit pricey for its performance
 Pentium-75 has 16MB of RAM, an 850MB hard drive, and a 4X CD-ROM drive, plus a generous bundle of CD-ROMs. Priced about \$250 lower, its speed and other attributes would have put it on the budget chart. \$2450. *USA Flex, Inc.*, 800/872-3539, 708/582-6202 **Reader service no. 633**

USA Flex DX4/100 MHz Custom System

PROS: 17-inch monitor, multimedia configuration, fax-modem, fine service policies
CONS: Disappointing performance for a 100-MHz system
 This low-priced DX4-100 midsize tower system comes with a big 17-inch monitor

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and a full multimedia configuration. This machine also has 8MB of RAM, a respectable 853MB hard disk, a long three-year warranty, and 24-hour technical support. Unfortunately, the unit is slow for a DX4-100. \$2199. *USA Flex, Inc.*, 800/872-3539, 708/582-6202 **Reader service no. 634**

WinBook XP DX4-100 16/810 TFT

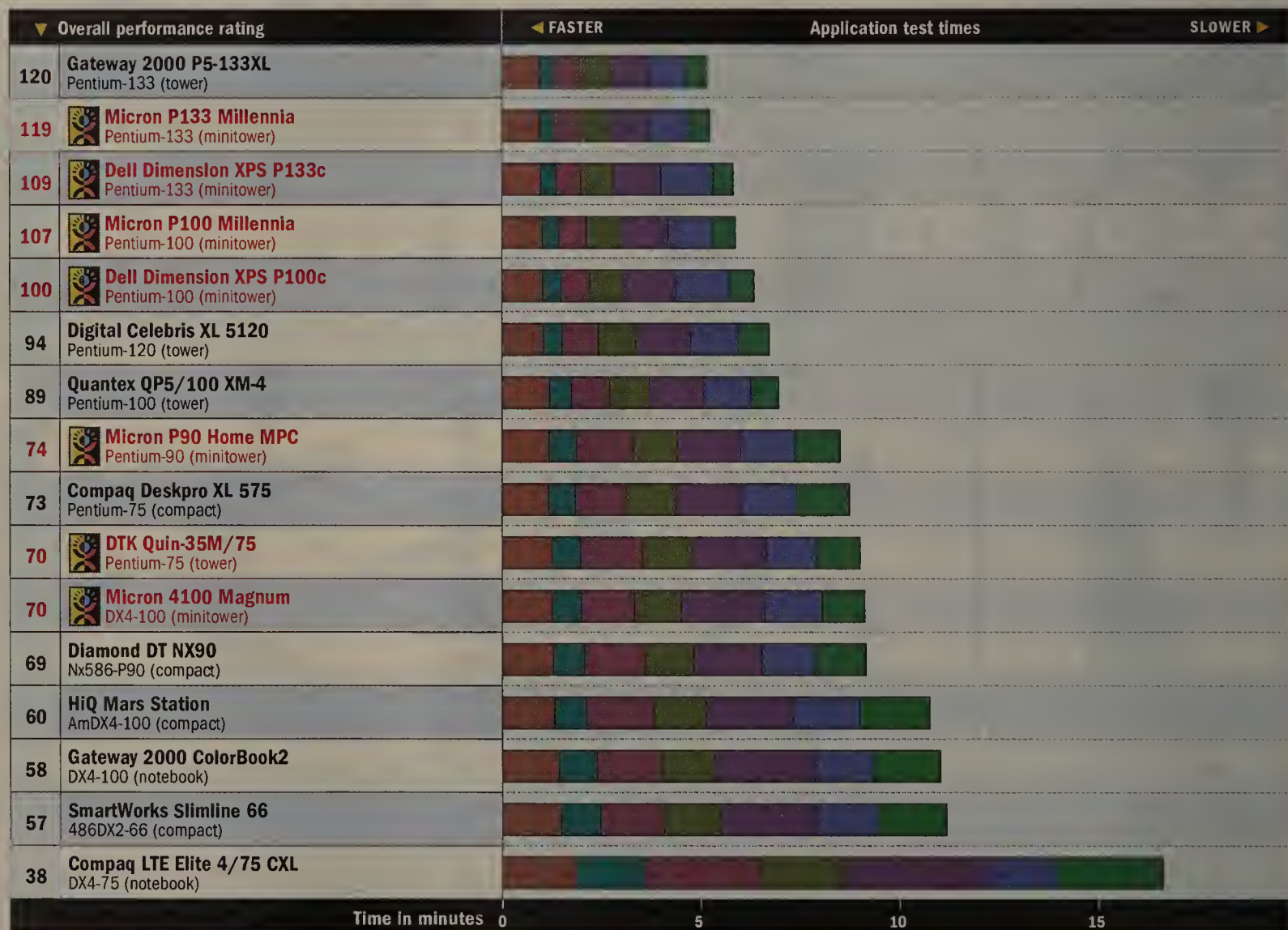
PROS: Solid setup includes 9.4-inch color-active display

CONS: Slow, battery life under 3 hours, one-year warranty

This lightweight 7.4-pound DX4-100 notebook comes well configured with 16MB of RAM, a generous 810MB hard drive, and

both trackball and minijoystick pointing devices. Unfortunately, the performance is quite slow compared to other DX4-100 notebook systems', and the battery life, at just under 3 hours, is too short for the typical business traveler. \$4279. *WinBook Computer Corp.*, 800/468-2162 **Reader service no. 635**

This Month's Contenders



Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from seven tests. A system may have a better overall performance rating than another system that took less time to complete our test suite.

Methodology

We tested each system as supplied by the manufacturer, using the version of DOS supplied. If we installed Windows, we used the default installation. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors using the supplied video driver where possible. We loaded the test applications and files and test automation software and scripts.

Word 2.0 for Windows

We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0

We opened a file and performed several data extracts, entered new data, altered calculations, formatted, scrolled, moved blocks, previewed, printed, and saved.

Paradox 1.0 for Windows

We used a custom form to add a moderate number of records to an existing table, performed several queries, and generated a report.

Freelance 1.0 for Windows

We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; then previewed and saved it.

WordPerfect 6.0 for DOS

We performed a variety of editing, formatting, previewing, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory requirements, the amount of free memory for DOS in the first 640K dramatically affects this test.

1-2-3 release 3.4 for DOS

Using the graphical Wysiwyg add-in and working in three different files, we created and altered formulas, built graphs, saved, and printed.

Paradox 3.5 for DOS

We tested Paradox 3.5 running under Windows in a DOS window. We entered data, searched records, updated, and generated reports from a simple customer list.

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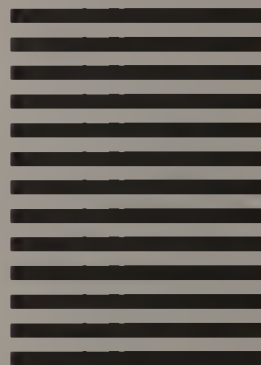
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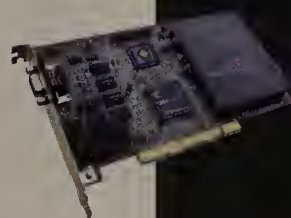


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	ZIP CODE										

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 8-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107-1496. Surveys must be received by August 31.

PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact prize winners at the telephone and fax numbers they provide. If *PC World* is unable to do so within 30 days of the drawing, a substitute winner will be selected. No purchase necessary. Void where prohibited by law.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. **WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES!**

How did you get this copy of PC World?

- By subscription On the newsstand From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

- | | | | | |
|------------------------------------|-------------------------------------|---------------------------------------|------------------------------------|---|
| <input type="radio"/> Acer | <input type="radio"/> CompuDyne | <input type="radio"/> Future Tech | <input type="radio"/> MIS | <input type="radio"/> Tandy |
| <input type="radio"/> Acma | <input type="radio"/> Comtrade | <input type="radio"/> Gateway 2000 | <input type="radio"/> NEC | <input type="radio"/> Tangent |
| <input type="radio"/> ALR | <input type="radio"/> Cornell | <input type="radio"/> Hewlett-Packard | <input type="radio"/> Netis | <input type="radio"/> Texas Instruments |
| <input type="radio"/> Apple | <input type="radio"/> CTX | <input type="radio"/> HiQ | <input type="radio"/> Packard Bell | <input type="radio"/> Toshiba |
| <input type="radio"/> AST | <input type="radio"/> Dell | <input type="radio"/> Hyundai | <input type="radio"/> Panasonic | <input type="radio"/> Twinhead |
| <input type="radio"/> AT&T (NCR) | <input type="radio"/> Diamond | <input type="radio"/> IBM | <input type="radio"/> PerComp | <input type="radio"/> USA Flex |
| <input type="radio"/> Austin (IPC) | <input type="radio"/> Digital (DEC) | <input type="radio"/> Insight | <input type="radio"/> Pionex | <input type="radio"/> VTech (Expotech, Laser) |
| <input type="radio"/> Axik | <input type="radio"/> DTK | <input type="radio"/> Intelesys | <input type="radio"/> Polywell | <input type="radio"/> WinBook |
| <input type="radio"/> Blackship | <input type="radio"/> Eltech | <input type="radio"/> Leading Edge | <input type="radio"/> Quantex | <input type="radio"/> Zenith (ZDS) |
| <input type="radio"/> Canon | <input type="radio"/> EPS | <input type="radio"/> Micro Express | <input type="radio"/> Samsung | <input type="radio"/> Zenon |
| <input type="radio"/> Compaq | <input type="radio"/> Epson | <input type="radio"/> Micron | <input type="radio"/> Sharp | <input type="radio"/> Zeos |
| <input type="radio"/> CompuAdd | <input type="radio"/> Everex | <input type="radio"/> Midwest Micro | <input type="radio"/> Swan | <input type="radio"/> Other |

What size is this PC?

- Desktop
 Notebook/laptop
 Handheld

What is the CPU?

- PowerPC
 Pentium
 80486
 80386
 Other

Where did you buy this PC?

- Local dealer
 Mail/phone order
 Direct from field sales force
 Membership discount store
 Computer superstore
 Home electronics store
 Retail store
 Value-added reseller
 Other

After ordering, how long did it take to get your PC?

- Less than 1 week
 1-2 weeks
 3-4 weeks
 More than 4 weeks

Who set up your PC?

- Dealer/retailer/VAR
 Staff computer technician
 Self or coworker

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

- | | | | | | | | | |
|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| <input type="radio"/> Jan | <input type="radio"/> Mar | <input type="radio"/> May | <input type="radio"/> July | <input type="radio"/> Sept | <input type="radio"/> Nov | <input type="radio"/> 90 | <input type="radio"/> 92 | <input type="radio"/> 94 |
| <input type="radio"/> Feb | <input type="radio"/> Apr | <input type="radio"/> June | <input type="radio"/> Aug | <input type="radio"/> Oct | <input type="radio"/> Dec | <input type="radio"/> 91 | <input type="radio"/> 93 | <input type="radio"/> 95 |

When you first set up your PC, were any components "dead on arrival" (DOA)?

- Yes No Don't know

If so, which component was it? (Mark all that apply.)

- | | | | |
|------------------------------------|--|---------------------------------------|------------------------------------|
| <input type="radio"/> Battery | <input type="radio"/> Graphics/video board | <input type="radio"/> Modem/fax board | <input type="radio"/> Power supply |
| <input type="radio"/> CD-ROM | <input type="radio"/> Hard drive | <input type="radio"/> Monitor/screen | <input type="radio"/> Sound board |
| <input type="radio"/> CPU | <input type="radio"/> Keyboard | <input type="radio"/> Motherboard | <input type="radio"/> Other |
| <input type="radio"/> Floppy drive | <input type="radio"/> Memory | <input type="radio"/> Mouse | |

Did your problem occur only after you added your own hardware or software?

- Yes No Don't know

Would you buy this brand of PC again?

- Yes No Not sure

How many times have you had a problem with this PC?

- No problem ever Three
 One Four
 Two More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

Please fill in your daytime phone number below.

- | | | | | | | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 0 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

NEW PROBLEM REPORT

Please answer for the most recent problem—other than DOA—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

- | | | | | | | | | |
|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| <input type="radio"/> Jan | <input type="radio"/> Mar | <input type="radio"/> May | <input type="radio"/> July | <input type="radio"/> Sept | <input type="radio"/> Nov | <input type="radio"/> 90 | <input type="radio"/> 92 | <input type="radio"/> 94 |
| <input type="radio"/> Feb | <input type="radio"/> Apr | <input type="radio"/> June | <input type="radio"/> Aug | <input type="radio"/> Oct | <input type="radio"/> Dec | <input type="radio"/> 91 | <input type="radio"/> 93 | <input type="radio"/> 95 |

How long was this after you purchased your PC?

- Less than 1 month 4-6 months More than 12 months
 1-3 months 7-12 months Not sure

Did the problem occur as a result of adding new hardware or software?

- Yes No Don't know

Did the problem occur under warranty?

- Yes No Don't know

What was the problem finally identified as? (Mark all that apply.)

- Faulty component Wrong configuration Device conflicts Other
 Incorrectly installed software Faulty peripheral OS problem Don't know

If a component failed, which one was it? (Mark all that apply.)

- | | | | |
|------------------------------------|--|---------------------------------------|------------------------------------|
| <input type="radio"/> Battery | <input type="radio"/> Graphics/video board | <input type="radio"/> Modem/fax board | <input type="radio"/> Power supply |
| <input type="radio"/> CD-ROM | <input type="radio"/> Hard drive | <input type="radio"/> Monitor/screen | <input type="radio"/> Sound board |
| <input type="radio"/> CPU | <input type="radio"/> Keyboard | <input type="radio"/> Motherboard | <input type="radio"/> Other |
| <input type="radio"/> Floppy drive | <input type="radio"/> Memory | <input type="radio"/> Mouse | |

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?

- Manufacturer
 Dealer/store where purchased
 Manufacturer's authorized repair technician
 Self Other

What types of service and support did you receive? (Mark all that apply.)

- Phone System swap
 On site Component swap
 In store Factory return

If you received phone service, how long were you on hold?

- Not at all 1-2 minutes 6-10 minutes More than
 Less than 1 minute 3-5 minutes 11-20 minutes 20 minutes

How long did it take before you talked to the person who finally helped you?

- Less than 15 minutes 2-5 hours 11-24 hours 3-5 days
 15 minutes-1 hour 6-10 hours 1 1/2-2 days 1 week or more

How long did it take to resolve the problem completely?

- 1-2 days More than 1 month
 3-7 days Never resolved
 1 1/2-4 weeks Awaiting resolution

Was the problem resolved to your satisfaction?

- Yes No

How would you rate the person(s) who helped you?

- | | | | |
|----------------|-----------------------|-----------------------|-----------------------|
| | Poor | Good | Excellent |
| Courtesy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Knowledge | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Follow-through | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Based on the service and support you received, would you buy this brand of PC again?

- Yes No

On the whole, how satisfied are you with the service and support you received?

- Not at all Satisfied Extremely satisfied

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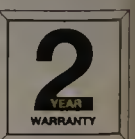
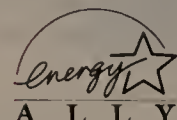
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Circle 107 on reader service card

Top 10 Windows Accelerators: VL Cards Still Kicking

Most graphics boards we test are based on the PCI bus. That's because vendors rush to put products into new PCI systems first. In fact, many boards are not available for ISA systems, and some even lack VL bus compatibility. But we haven't forgotten about the millions who own ISA and VL bus systems. This month we tested the VL versions of three top-rated PCI boards—the Hercules Terminator 64 DRAM, the STB Powergraph 64, and the Diamond Stealth Video—under our Windows Integrated Test Suite (WITS).

Of these three VL boards, only the Terminator 64 DRAM trailed much behind its PCI mate, with a 6 percent performance lag. The Diamond Stealth Video had the closest scores between versions, with a PCI score of 80.7 and a VL score of 79.9—a tight 1 percent difference. The VL-based Powergraph 64 came within 2 percentage points of the PCI version's 78.2 WITS score. Comparing data from 20 pairs of boards we've tested in VL and PCI versions, we found that, on average, VL bus performance lags 4 percent behind that of the PCI.

In pricing and features, differences all but disappear. The first PCI

boards cost somewhat more than identical VL boards, but bus versions are now usually priced the same. Refresh rates, memory upgrades, and software utilities also are identical, though PCI boards generally offer easier installation and greater reliability. If you own a VL system now, you are still getting all the features of PCI boards—and comparable

performance. But if you plan to buy a new system, we'd suggest getting one with a PCI bus, as VL boards may become rare.

We reviewed one new board this month, the video-capable DFI Amazon 64 (which uses the PCI bus). The 2MB

VRAM Amazon delivers impressive video acceleration and scaling and boasts a strong 77.6 WITS score. But at \$385, it's pricey, and it lacks the software tools of most Top 10 boards.

Finally, the ATI Graphics Xpression jumped to number four from number nine, thanks to a \$35 price cut, while the Orchid Fahrenheit 64 reentered the list at number ten following a \$20 drop.

WITS was developed by Jon Peddie Associates, a PC graphics consulting firm. Jon Peddie and Fred Dunn are the firm's principal officers.

Owners of VL systems still get PCI board performance and features.

TOP 10 ACCELERATORS

Overall value	Estimated street price	Windows Integrated Test Suite scores								Overall WITS	RAM (MB/type) ¹	Chip Driver date	Reader service number
		Windows Word 2.0 for	Excel 4.0	3.0 CorelDraw	1.1 PhotoStyler	3-11 QuarkXPress	Freelance Graphics 2.01						
1	Hercules Terminator 64 DRAM ² 800/532-0600	100	\$199	14.3	17.3	13.7	12.8	17.0	7.0	82.1	2 / D PCI	Trio64 2/16/95	601
2	STB Powergraph 64 ² 800/234-4334	99	\$180	13.6	16.5	13.7	11.7	16.7	6.1	78.2	2 / D PCI	Trio64 7/11/94	602
3	rPC FireStorm64 800/459-4772	98	\$200	13.9	16.9	13.8	11.6	17.0	6.8	79.9	2 / D PCI	Vislon864 3/1/95	603
4	ATI Graphics Xpression 905/882-2600	97	\$174	13.4	16.6	13.2	11.6	15.6	4.8	75.1	2 / D PCI	88800CX 4/11/94	604
5	Diamond Stealth 64 DRAM ² 800/468-5846	97	\$206	14.2	17.1	14.3	11.7	16.8	6.1	80.1	2 / D PCI	Trio64 10/29/94	605
6	Diamond Stealth Video ^{2,3} 800/468-5846	97	\$233	14.4	17.5	13.6	11.6	17.2	6.4	80.7	2 / D PCI	Vislon868 3/9/95	606
7	STB Velocity 64V ³ 800/234-4334	96	\$299	14.3	18.0	14.4	11.6	17.0	7.1	82.4	2 / V PCI	Vislon968 3/10/95	607
8	Paradise Bahamas 64 800/568-9272	96	\$169	13.7	16.4	13.3	11.3	16.6	6.3	77.4	2 / D PCI	Vislon864 7/11/94	608
9	Hercules Stingray 64/Video ³ 800/532-0600	96	\$195	13.8	16.0	13.7	11.8	16.0	3.8	75.0	2 / D PCI	Ark2000PV 10/27/94	609
10	Orchid Fahrenheit 64 800/767-2443	94	\$199	13.1	15.9	13.6	11.5	16.5	6.4	77.0	2 / D VL	Vislon864 12/14/94	610

Methodology Boards were tested at 1024 by 768 resolution at 256 colors and a minimum 70-Hz refresh rate on a 486DX2-66 with 16MB of RAM and 256K of secondary cache. Application scores are the factor by which a board exceeds our baseline system, an unaccelerated ET4000-based VGA adapter on a 386DX-25 with 16MB of RAM. The overall value score balances performance, estimated street price, and features. The overall WITS score is the aggregate of the application scores. For all scores, higher is better.

¹ D = DRAM, V = VRAM. ² Comparable value offered by VL bus versions tested. ³ Also offers video acceleration. For more information about all products in this table, circle reader service no. 901.

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[†]In Canada, call 1-800-387-3867. *Average U.S. street price. Monitor not included. [‡]Source: 1994 J.D. Power and Associates Desktop PC Customer Satisfaction Study.SM Study conducted among business Second and third year, return to dealer. MS-DOS is a U.S. registered trademark and Windows is a U.S. trademark of Microsoft Corporation. Pentium and the Intel Inside logo are U.S. registered

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In addition, HP ranked best overall among desktop PC business users in the 1994 J.D. Power and Associates Customer Satisfaction Study.¹

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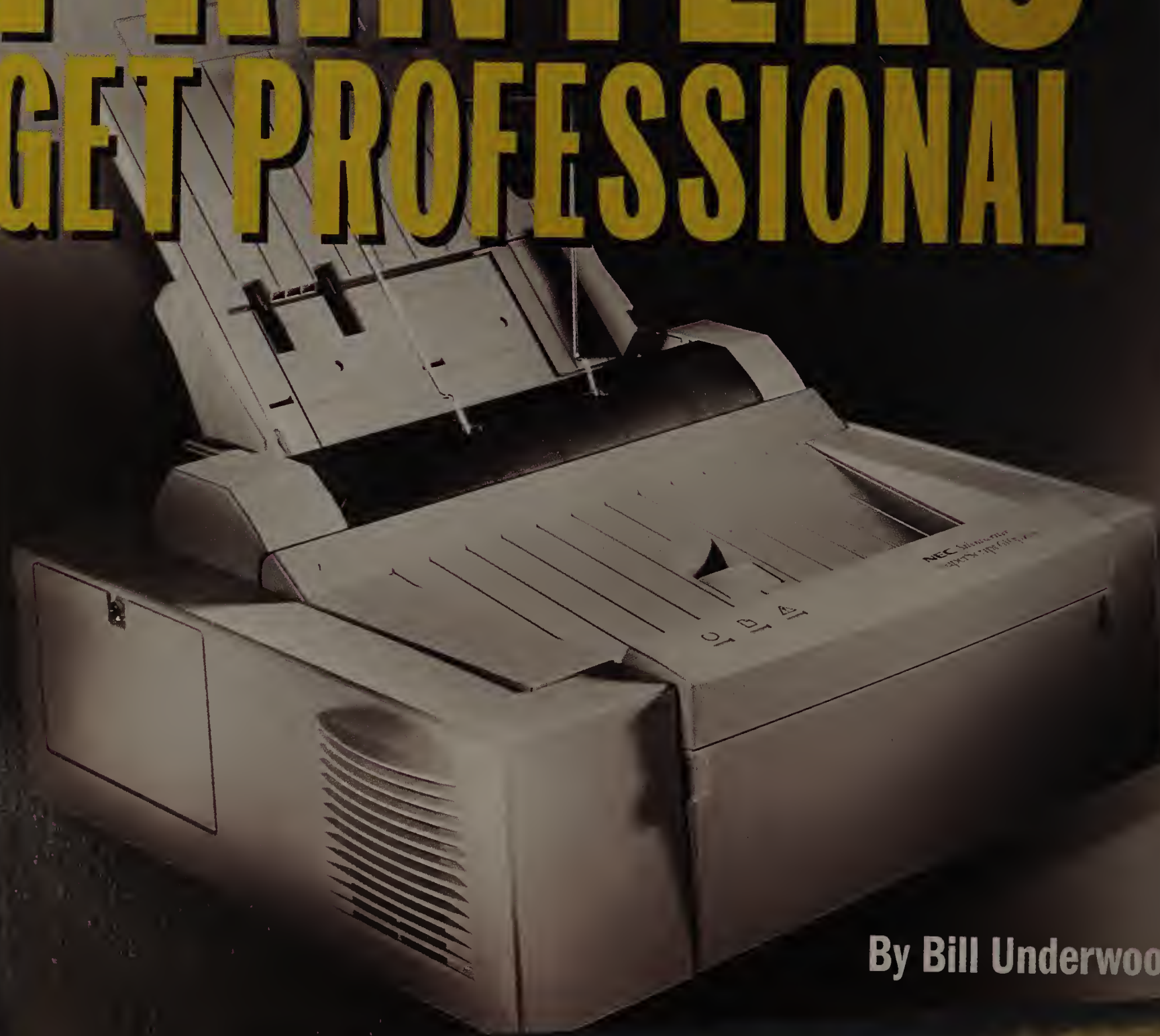
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PERSONAL PRINTERS GET PROFESSIONAL



By Bill Underwood

INTRODUCING PC WORLD'S TOP 10 PRINTERS



Priced as low as \$236, today's laser and ink jet printers offer superb text, rich color, and competitive performance. In this month's debut of the Top 10 Printers, Best Buys from NEC and Canon top the chart.

For the budget-conscious, buying a personal printer used to mean sacrificing print quality or capabilities for the lower price. But the revolution is upon us: Now you can produce documents with ultracrisp text, the smoothest of transitions between shades of gray, and vibrant colors—output quality that rivals what you once found in printers costing thousands of dollars.

This month, we introduce our Top 10 Printers review. Here you'll encounter the best val-

ues among all available printers. Each month, we'll test a new selection of printers and compare them to those we've already reviewed. The overall best will appear on our Top 10 chart. We'll alternate reviews of personal printers with networkable printers designed to serve small and larger workgroups.

To launch the Top 10 Printers, we reviewed 16 monochrome and color printers intended for individual use. They can all be found on the street for under \$800. Of the current crop, the 5 best monochrome and 5 best color printers appear on the chart on page 215. All employ-

either laser or ink jet technology. Resolutions range from 300 to 720 dpi, and letter-quality print speeds range from two to six pages per minute. We conducted a battery of performance and hands-on tests to evaluate output quality, price, features, and ease of use. For ink jet printers, we created output using a variety of coated and glossy papers that, although more expensive than plain paper, produced near-photographic results.

For more information on our rating methodology, see "Introducing the Top 10 Printers."

Finding the Best Printer

If all you want to print is text or gray scale without color, our Best Buy in monochrome is a laser: the NEC Silentwriter SuperScript 610plus. Small and economical, it delivers excellent monochrome pages at 300 dpi and a speedy 6 pages per minute.

The Canon BJC-600e ink jet is our color printer Best Buy. For a street price of about \$499, it boasts 720-by-360-dpi text and 360-by-360 dpi color resolution. Yielding the best ink jet value in black text and color, this printer also has one of the lowest costs per page of any ink jet we tested.

While the Best Buys represent the tops in overall value, we encourage you to examine closely other printers in the Top 10

Laser printers are fast and highly reliable; they also yield excellent print quality on a wide variety of papers.

chart to find the best solution for your particular needs.

Few people realize how much it will cost them to buy consumables—ink or toner, paper, and other print media. Our Features Comparison table and the sidebar "The Cost of Consumables Numbers Game," explain the ongoing expenses of printing for each unit reviewed. The Top 10 chart shows the actual cost per page for each printer. You might spend more on consumables than you do on your printer, so it pays to think ahead.

When it comes to paper handling, aim for simplicity. Fold-out paper doors, trays, or paper support wireforms can be ungainly. We liked the built-in sheet feeders on the Canon units. Is it easy to remove a jammed piece of paper? If you use special papers, bring some to the store to make sure the printer can handle it.

Your ink or toner cartridges should also be easy to replace. Most involve no more than one or two steps, but the Digital DECcolor-writers required fiddling with switches and applying an uncomfortable amount of force to insert the cartridge.

What about the overall design? Can you understand the controls and indicators? Does the unit fit your workspace? For our Features Comparison we measured "working" dimensions with allowance for attached cables, paper trays fully extended, and room for air circulation. In working mode, a printer may take up more space than vendor dimensions suggest.

Don't forget to check the vendor's service and support policies, too. If you run into trouble, you'll appreciate a toll-free support line that's open long hours or a quick turnaround on factory repairs.

Want Simple? Choose a Laser

It helps to understand the fundamental differences between lasers and ink jets, since each imposes different requirements on the user. Generally, personal laser printers output in black only. The initial cost of a laser is usually higher than that of an ink jet, but lasers are faster, are highly reliable, and yield excellent print quality on a wide variety of papers. They have long engine lives, require relatively little attention, and often hold more paper than ink jets.

Inside the printer, a laser draws an image of your page onto a photosensitive drum. Toner sticks to the image on the drum and is transferred to the paper. Heat and pressure melt it into the fibers. A laser printer generates heat—350 to 400 degrees Fahrenheit—and gulps a lot of electricity in the process. Many laser printer manufacturers now incorporate EPA Energy Star compliance into their designs; these printers will automatically power down into a sleep mode after a period of inactivity.

What A Difference a Page Makes

Canon BJC-600e
Plain paper
360x360

Canon BJC-600e
Glossy paper
360x360

NEC SuperScript
610plus, plain paper
300 dpi

Za
This is 8 point text
This is 9 point text
This is 10 point text



Our Best Buy monochrome, a laser (above), prints well on plain paper. The color Best Buy (left) shows how special paper can improve ink jet output quality.

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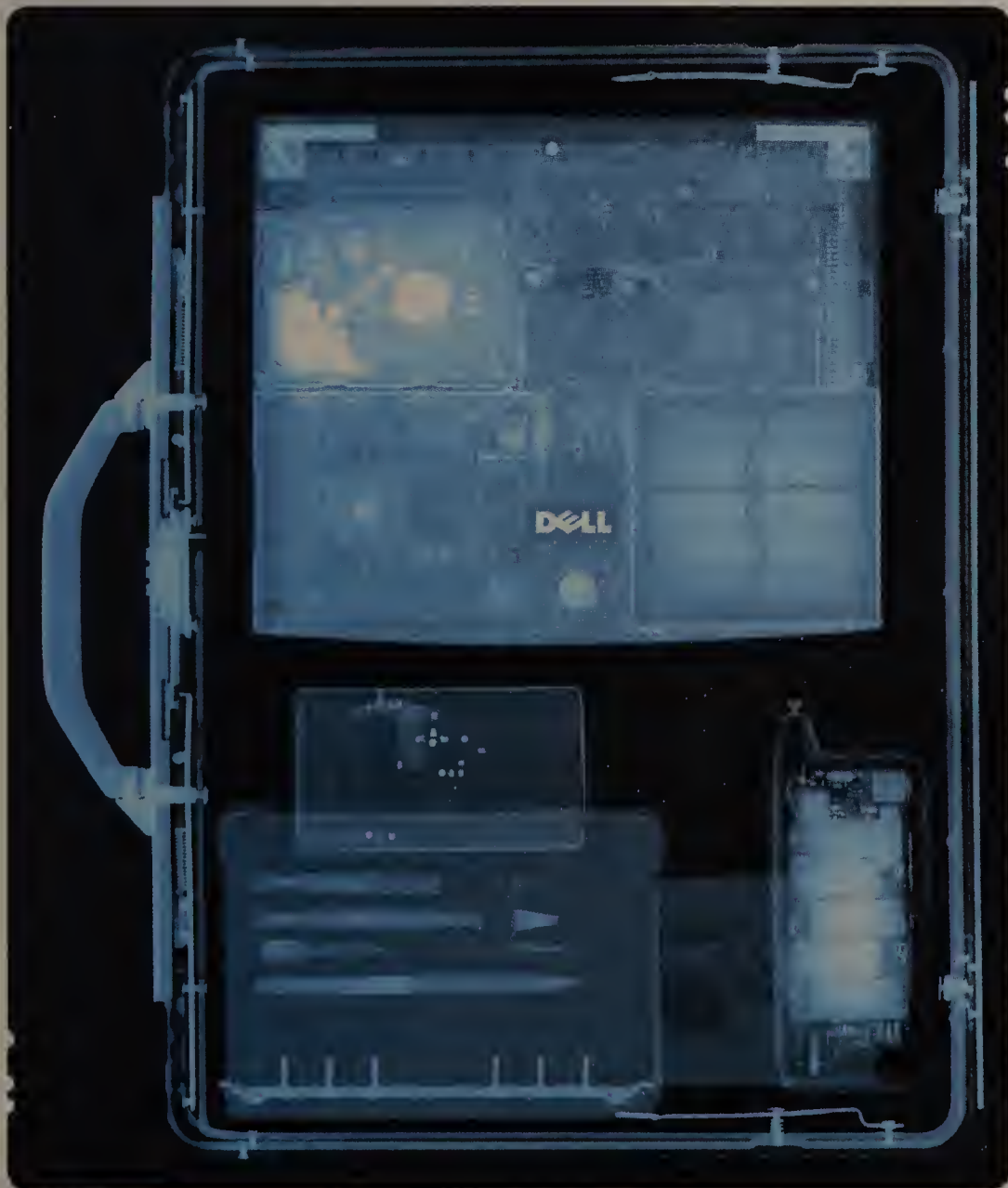
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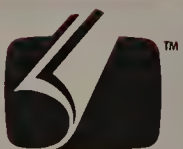
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Introducing the Top 10 Printers



NEC Silentwriter SuperScript 610plus

The Top 10 Printers chart will help you sift through the hundreds of printers on the market and find the best one for your office or home. Every month, a new batch of personal or networkable printers will be ranked against those previously reviewed that are still available, generating a list of the overall best in each category. Personal printers, reviewed every other month, will be split into the top five monochrome and top five color. We've divided printers meant to be shared into workgroup printers for small departments and network printers for larger offices.

Output quality and speed ratings start with

the Top 10 Printers test suite. It uses mainstream business applications and includes documents and spreadsheets of varying complexity, plus graphics: a page of lines, curves, and gray-scale images; and a full-color photograph (for color printers only). A printer's total time running each app—as shown in the

Test Report—is weighted according to the level of use we expect among typical PC World readers. The resulting speed ratings we divided by text and gray-scale (monochrome) and color applications.

We also make periodic shopping trips to gather current street prices for the printers, and we price consumables to calculate each printer's cost per page. Finally, we conduct extensive hands-on testing to assess each printer's quality of design and construction for our ease-of-use rating. All these ratings factor into a printer's overall value.

All numbers are on a scale of 1 to 100, with

100 being the best. But you can't compare overall value between categories, since that rating reflects the different priorities of each category of printer. For personal printers, out-



Canon BJC-600e

put quality and features each comprise 25 percent of the overall value. Price, performance, and support policies each comprise 15 percent of the total, and cost of consumables takes the remaining 5 percent.

TOP 10

PERSONAL PRINTERS

MONOCHROME

COLOR

Type	Average street price	Overall rating	Output rating		Speed rating		Cost per page		Ease-of-use rating	Maximum resolution monochrome/color (dpi)	Rated text speed mono-color (ppm)	Installed RAM	Reader service no.		
			Text and gray scale	Color	Text and gray scale	Color	Text and gray scale	Color							
1	NEC SuperScript 610plus 800/632-4636	laser	\$399	85	67	—	55	—	\$0.03	—	72	300	6	256K	744
2	Brother HL-630 800/276-7746	laser	\$389	80	50	—	53	—	\$0.02	—	75	300	6	500K	745
3	NEC SuperScript 660 800/632-4636	laser	\$599	78	64	—	51	—	\$0.03	—	72	600	6	256K	746
4	Brother HL-660 800/276-7746	laser	\$700	78	57	—	43	—	\$0.02	—	81	600	6	2MB	747
5	Epson ActionLaser 1500 800/289-3776	laser	\$486	77	64	—	42	—	\$0.04	—	81	300	6	1MB	—
1	Canon BJC-600e 800/848-4123	ink Jet	\$492	85	60	60	27	33	\$0.02	\$0.04	77	720/360	2.5/1	60K	748
2	Epson Stylus Color 800/289-3776	ink Jet	\$526	83	57	50	23	28	\$0.02	\$0.05	75	720/720	3/.5	64K	—
3	Canon BJC-70 800/848-4123	portable ink Jet	\$382	76	50	50	35	26	\$0.08	\$0.08	81	720/360	4/.8	35K	749
4	Digital DECcolorwriter 520lc 800/777-4343	ink Jet	\$349	73	40	40	33	26	\$0.01	\$0.14	59	300/300	5/.5	128K	750
5	Lexmark ExecJet IIc 800/358-5835	ink Jet	\$299	70	43	40	20	23	\$0.03	\$0.08	75	600/300	3/.4	21K	751

Need Color? Go for Ink Jet

Ink jets allow you to print in black or color, but you'll have to play with driver settings and choose paper carefully to get the best print quality, because ink jet results vary with the medium. Paper, transparencies, and label stock specifically made for ink jets help attain good results, especially with color. To help you make the picture-perfect print, see "Tweaking Tips for Great Color Output."

Although ink jets are gaining on low-end lasers in speed, they are typically slower. No matter how quickly your CPU can feed the information to the printer, it must wait for the print engine to catch up as the carriage chugs back and forth, showering millions of microscopic ink droplets on each pass and making several passes per line before a page finally emerges.

So ink jet printers can be slow. But unlike lasers, they don't gobble electricity like a hair dryer set on high. Check each printer's maximum power consumption in our Features Comparison table to help you decide if your new printer can be plugged into the same circuit as your PC or stereo without blowing a fuse.

Although an ink jet printer costs more in consumables (see "The Cost of Consumables Numbers Game"), you would have to print thousands of color ink jet pages before reaching the price of a thermal wax or laser color printer. Meanwhile, a color ink jet printer can enhance your business image with full-color charts and presentations or spot color on reports and brochures; the home user can produce stationery, full-color drawings, and more.

The design and arrangement of cartridges in a color ink jet printer can affect your print quality and printing costs. Color printers mix the colors cyan, magenta, and yellow (abbreviated as C, M, and Y) to make all other colors, including black (abbreviated as K) if a separate black is not available. However, multiple passes of each color are needed to make black, and the result is not as good as what you'd get from a separate black cartridge.

Check our Features Comparison for color cartridge configurations. Look for a printer with at least two cartridges—CMY and K—that can be installed side by side. Some machines accept only one cartridge at a time (CMY or K). You'll have to swap between color and black—meaning more work for you and a greater likelihood of the idle cartridge drying out. A separate cartridge for each color (C, M, Y, K) is best, since you replace only the color that runs out. With an all-in-one CMY cartridge, you throw the whole thing away when only one color is depleted.

With color ink jet printing, print driver settings and options become critical; unfortunately, it's not something you can usually see until you buy the printer. A well-designed driver provides default settings that produce good results on a wide variety of images. With patience, you can often improve on the default settings. If you like to tweak, the Lexmark ExecJet IIc offers the most print setting options in an elegant interface.

Personal Printers Offer Something for Everyone

If a low startup cost is your goal, a color ink jet printer fits the bill with style. The perceptible difference in color output quality

Though its consumables cost more, you'd have to print thousands of color pages from an ink jet printer before you would reach the price of a thermal wax or laser color printer.

between low-cost color ink jets and high-cost lasers shrinks almost daily. If you take the ink jet path and work within its special demands, experimenting with papers and print driver settings, you will be pleasantly surprised. Not interested in color, or looking for reliability without tinkering? A laser printer can't be beat.

In the booming personal printer market, there's always another model on the horizon. Watch for the October issue, where we'll review a new batch of personal printers for the Top 10 chart.

Bill Underwood is a computer consultant and writer with over 16 years' experience in computer graphics as well as printer design, testing, and manufacturing.

Edited by Melissa Riofrio. Testing performed by Dave Casini and Ulrike Diehlmann of the PC World Test Center. Research by Arden Hoffman.

For more information on all products in this article, circle reader service number 907.

Monochrome Printers

1 **NEC Silentwriter SuperScript 610plus**

Average Street Price: \$399

Maximum Resolution (Black): 300 by 300 dpi

Text Printing Speed: 6 pages per minute

Output Quality: Very good text, line art and gray scale

The SuperScript 610plus is the entry-level member of the 6-ppm family of NEC Silentwriter lasers. It was the fastest printer we tested, and one of the least expensive. Roll all this in with its clean, compact design, and the 610plus wins our overall Best Buy for monochrome printers.

It may be entry level, but the 610plus offers text and gray-scale capabilities that should satisfy virtually any home or business use. Gone are the multitude of buttons and cryptic display codes on the printer's front panel; instead the NEC driver runs a pop-up Windows application that reports printer status, defines installed options, and provides access to all other optional settings.

The 610plus and its siblings can all do spot color—a nice feature not found in many monochrome laser printers—by replacing the black toner cartridge with a blue, red, or yellow one. NEC does not recommend using this feature on transparencies, however.



NEC Silentwriter

Tweaking Tips for Great Color Output

There are three major components you can adjust to coax the best from your color ink jet printer: the print medium (what you will print on), the print settings (how you tell the printer to behave), and the quality of the original image or file you're printing. If you try to print a poor-quality image or something with dull colors, paper and print-setting experiments won't get you far.



Media

- Most plain copy paper is not suitable for getting the best text or color print quality; use coated paper. One of the best we found was Epson's 720 paper. For the ultimate in quality, try one of the premium glossy papers, which are actually more like film than like paper.

- Be sure to print on the correct side of your special paper. It's not always easy to tell, but the rule of thumb is to use the

brighter and/or smoother side of the page. Also look for false watermarks indicating the "wrong" side, such as you see on Hewlett-Packard paper.

- Avoid rough or textured paper unless you are printing a draft copy; a rough surface generally results in poorer print quality.

- A bright white finish helps colors stand out. Printing on colored paper changes the colors you use and mutes all except one that matches the paper.

- For transparencies, use the special ink jet kind and be sure to print on the correct side. Laser transparencies just do not work; they are too smooth.

- Some label stock has been made with ink jet printing in mind. Check with your manufacturer or an office supply store to find it.



Software

- Experiment after trying the default settings; you can

often improve on these. Look for settings that apply to the type of output—text, photograph, and so forth—or the medium on which you are printing: plain or coated paper, or transparencies. Also look for settings that help distribute the colors more evenly, such as "dithering."

- Driver updates: Vendors periodically update printer drivers, but you probably won't find out unless you ask. You can call the vendor directly for an update or download the new file from the vendor's BBS.



Adjusting the Original

- Start with a good source file. Use an image-editing program to adjust colors, contrast, and brightness, and to repair defects such as spots.

- If your computer or scanning software supports color matching or adjusting, use this feature.

One drawback: You must use what the manual calls a "good-quality printer cable" because of the high-speed bidirectional data transfer between the CPU and printer. The 610plus couldn't use a parallel cable that worked fine with other printers in our review. NEC recommends a cable specifically labeled as "IEEE 1284" or "bidirectional compatible" to assure trouble-free data transfer. And the standard 50-sheet feeder isn't as slick as the slide-in trays or internal feeders on other units. Buy the optional 200-page feeder.

We had no other disappointments. With very good output quality, speedy performance, and a small footprint, the 610plus captured first place in our Top 10 Personal Printers.

2 Brother HL-630

Average Street Price: \$389

Maximum Resolution (Black): 300 by 300 dpi

Text Printing Speed: 6 ppm

Output Quality: Good text, line art, and gray scale



Brother

The Brother HL-630 won a Best Buy in our laser printer review in the February issue; this month it returns at second place. Its text and line art print quality is fine for general use. Gray-scale images were on a par with other 300-dpi lasers.

The HL-630 engine incorporates the flattest paper path of any ven-

dor we evaluated; look for this if you print on thicker media.

From initial setup through paper and cartridge replacement, the HL-630 is a breeze to use. The printer has no power button—simply plug it in, and a green light indicates the printer is on. The cooling fan is loud, but in Energy Star sleep mode the printer becomes quieter.

The HL-630 sports a low relative price and good laser print quality. Speedy performance and a low toner cost per page all contribute to a persuasive combination.

3 NEC Silentwriter SuperScript 660

Average Street Price: \$599

Maximum Resolution (Black): 600 by 600 dpi

Text Printing Speed: 6 ppm

Output Quality: Very good text, line art, and gray scale

The NEC SuperScript 660 is the next step up from the 610plus. For \$599, resolution doubles to 600 dpi with very little speed penalty. Surprisingly, overall print quality was not quite as good as that of the 610plus.

Setup is easy, except for the same cable problem we reported for its sibling 610plus. The compact footprint of all three NEC printers in this review make them ideal lasers, sizewise, for cramped offices.



NEC Silentwriter



THE MICRON MILLENNIA

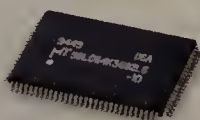
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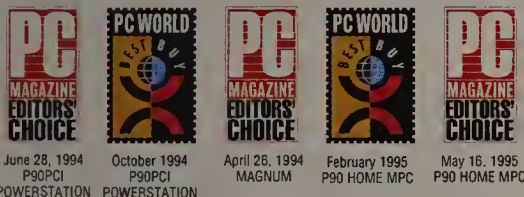
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COMPAQ	8.4	7.7	7.7	7.4
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Circle 57 on reader service card

Like the other SuperScript printers we reviewed, the 660 is a sports car among laser printer sedans—small, fast, and attractive. Although speedy, it was also the third most expensive, a fault only partly mitigated by its print quality. For all this, it crossed the monochrome printer finish line in third place.

4 Brother HL-660

Average Street Price: \$700

Maximum Resolution (Black): 600 by 600 dpi

Text Printing Speed: 6 ppm

Output Quality: Very good text, line art, and gray scale

The Brother HL-660 laser printer was one of the faster printers we reviewed, with print quality slightly lower than that of other 600-dpi lasers we tested—meaning it was still very good. We liked its



line art and gray-scale images, and text output was sharp and clean, typical of a 600-dpi printer.

The HL-660 manages a nearly straight paper path that helps minimize paper curl and jamming, which are more troublesome with thicker stock. Unfortunately, to have this flat path you must unfold

the front output tray, increasing the footprint by about 40 percent.

As with its Best Buy relative, the HL-660 is easy to install and use, and replaceable toner cartridges lower its cost per page—but it also has that unusually loud fan. You can tell when Energy Star mode kicks in, because the printer thankfully falls silent. You'll find yourself setting the Energy Star time delay to a short interval just to reduce fan noise.

Although it loses points for having both slower performance than its peers and a high street price, the Brother HL-660 still rates well in output quality and cost per page—a balance that puts the HL-660 in fourth place in our monochrome printer category.

5 Epson ActionLaser 1500

Average Street Price: \$486

Maximum Resolution (Black): 300 by 300 dpi

Text Printing Speed: 6 ppm

Output Quality: Very good text, line art, and gray scale

The Epson ActionLaser 1500 offers half the resolution of the higher-priced ActionLaser 1400 (see Printer Snapshots), but it's faster at 6 ppm. It's not quite as fast or as cheap as our Best Buy, but for \$486 you get more standard paper capacity (150 sheets), and an optional bottom-feed unit will hold another 250. The setup and maintenance guides were very helpful, and we had the printer completely installed in minutes.



Paper handling is nice—your output lands on top of the printer, eliminating the ungainly paper-bail appendages that hang off many

printers like an afterthought. But toner cartridges cost more than any of the lasers we tested, at \$160 each.

Though it's a 300-dpi machine, the ActionLaser 1500 produced text, gray-scale, and line art good enough to compete with those of the 600-dpi lasers in our tests. Performance was decent, and it rated high in ease of use. A competent printer overall, it earns a fifth-place ranking among the monochrome contenders.

Color Printers

1 Canon BJC-600e

Average Street Price: \$492

Maximum Resolution: 720 by 360 dpi black, 360 by 360 color

Print Speed: 2.5 ppm black, 1 ppm color

Output Quality: Very good color, text, line art, and gray scale

Our Best Buy color printer is a winner on all fronts. Even on plain paper, you see richly saturated colors. The print driver's default halftone options resulted in consistently great output with little fiddling. The BJC-600e performed the fastest printing color, although in overall speed it was only average. And this unit, unlike its peers in this review, allows separate cartridges for a no-waste approach to ink. Ink costs were low: 2 cents per black page and 4 cents per ink



for a color page.

The Quick Start Guide and a well-written manual ease the installation process. Paper loading and cartridge replacement are easy, too.

With the printer, Canon bundles its Color Advisor and Visual Guide software, plus stationery templates.

Overall, we found this printer quiet, attractive, versatile, and capable of impressive color with little experimentation. With the best color speed in our review, the BJC-600e took the Best Buy spot in our color printer ratings.

2 Epson Stylus Color

Average Street Price: \$526

Maximum Resolution: 720 by 720 dpi black, 720 by 720 dpi color

Print Speed: 3 ppm black, .3 ppm color

Output Quality: Very good color, text, line art, and gray scale

At 720 by 720 dpi in monochrome, the Epson Stylus Color ink jet printer was the highest-resolution device we tested—higher than many laser printers available today. However, we found the quality at 360 dpi to be more than adequate for everyday use, and a lot more practical for reasonable print times—720-dpi printing is pretty slow. This Epson's print quality is better than that of the BJC-600e; but with a higher street price and slightly higher cost per page, the Stylus narrowly misses being the color printer Best Buy.

Credit for the print quality goes to the Stylus Color's 360-dpi piezoelectric ink jet head, which provides a more uniform drop size, according to Epson, and MicroWeave, which moves the print head and paper feed mechanism in small increments. It's slower,

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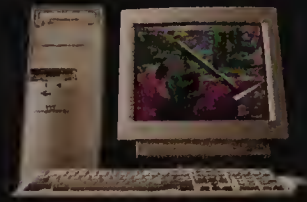
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but it helps yield the 720-dpi mark and eliminates some banding.

Epson's special coated paper produced prints that easily rival those of color printers costing thousands of dollars more. The same paper yielded text quality comparable to anything a personal laser printer could offer.

The Epson's large footprint makes it look clunky next to its typically sleek ink jet peers. We also disliked its loud, back-and-forth carriage motion sound, reminiscent of a dot matrix printer.

These negatives are forgivable, considering that the Stylus demonstrated bright, impressive color and sharp text, especially on coated paper. To ice the cake, the relatively large ink cartridges can print more pages than most ink jets, contributing to a low black-ink cost of 2 cents per page and a low color cost of 5 cents per ink color per page. With all this capability in one box, the Stylus Color earns a very close second place among color printers.

3 Canon BJC-70

Average Street Price: \$382

Maximum Resolution: 720 by 360 dpi black, 360 by 360 color

Print Speed: 4 ppm black, .8 ppm color

Output Quality: Very good color, text, line art, and gray scale

The Canon BJC-70 portable color ink jet printer stands out with its sleek, compact design, but it's also fast, nailing first place in overall speed among the nine ink jets reviewed.

The BJC-70's print quality is almost as good as what we produced from its higher-priced sibling, the BJC-600e. And despite its small size, the BJC-70 makes room for both its CMY and K cartridges simultaneously—a definite advantage over the Hewlett-Packard DeskJet 320 portable, which juggles the two. We noticed slight horizontal banding when we printed a gray-scale document in Normal mode, which diminished in the slower Fine mode. Ink costs are on the high side: 8 cents for a black or color page.

After a simple setup, aided by the clearly illustrated Quick Start Guide card, we were printing color documents in minutes. As with the BJC-600e, Canon's Color Advisor and Visual Guide software help the amateur with color matching and paper selection.



The top panel controls are easy to understand and use. An unusual, yet attractive, semicircular LCD display tracked printer status. Paper and ink cartridges install with a click.

Living with the BJC-70 on the road is no problem. Pop open the top cover and you have an automatic paper feeder with capacity for 30 sheets of paper or 5 envelopes. Smaller than most notebooks, the 3.1-pound BJC-70 was the lightest printer tested. At 2.2 inches it fits easily into your briefcase; even the AC adapter is slim compared to the "bricks on a leash" of some other portable printers.

We admired the Canon BJC-70's tenacious performance and its impressive print quality. With a third-place color printer finish, it's a machine that offers mobile or cramped-desktop printing with few compromises.

The Cost of Consumables Numbers Game

The math is a little crazy, but one pattern is clear: While you can bring home ink jet printers for less money than lasers, the pages they produce usually cost more. The truth lies hidden beneath the street price of a cartridge or its page life, and only your own printing habits really matter in the end. We compared laser and ink jet page costs by leveling the vendors' claims, then calculating the cost per page for ink or toner. Our findings show in our Top Ten Personal Printers chart. They do not include the cost of paper or electricity.

Vendors specify ink or toner cartridge life based on different usage assumptions, making real comparisons difficult. Page coverage is the term vendors use to specify the percentage of ink or toner applied to a typical letter-size sheet. Vendors assume different percentages, but for black-ink text documents, 5 percent coverage seems to be a universal measure. This means that 5 percent of the page is covered with black dots, while 95 percent is unprinted. In color, 7.5 percent coverage per color seems to be the norm. To level the playing field, we adjusted vendor claims of page life to reflect 7.5 percent color coverage in cases where they specified a different value.

We collected prices for replacement toner and black and color ink cartridges by visiting several local computer and office supply stores.

Using vendor estimates of how many pages an ink or toner cartridge should produce, we arrived at a cost per page for typical page coverage.

The results? For the ink jet printers reviewed here, your text-only page can cost anywhere from 1 to 10 cents for ink, compared to just 2 to 4 cents for toner for the same page produced on a laser printer. A three-color ink jet page costs between 4 and 14 cents for each color used.

Want high-quality output? Add another 11 cents for coated paper, and text pages increase to 12 to 21 cents each. Color on coated paper jumps up to 23 to 53 cents per page.

Want the best possible quality? Add about a dollar for premium glossy paper stock, and the price tag for that text page is \$1.01 to \$1.05. A three-color print takes the most dramatic leap: It costs you anywhere from \$1.23 to \$1.53 every time you click Print.





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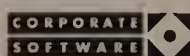
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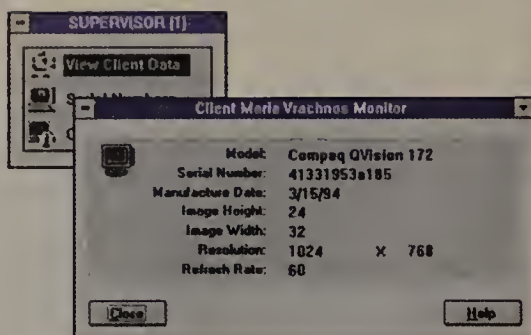
Circle 182 on reader service card

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Circle 88 on reader service card



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FEATURES COMPARISON Personal Printers Bring Color, Speed to Your Desktop

● = Yes ○ = No
n/a = not applicable



	Canon BJC-600e	Canon BJC-70	Digital DEC- colorwriter 120ic	Digital DEC- colorwriter 520ic	Epson Stylus Color	HP DeskJet 320	Lexmark ExecJet IIc
Standard features							
	COLOR PRINTERS						
Printer type	ink jet	portable ink jet	ink jet	ink jet	ink jet	portable ink jet	ink jet
Street price as of 5/12/95 ¹	\$492	\$382	\$290	\$349	\$526	\$370 ²	\$299 ³
Maximum resolution, black printing only (dpi)	720 x 360	720 x 360	300 x 300	300 x 300	720 x 720	600 x 300	600 x 300
Maximum resolution, any color printing (dpi)	360 x 360	360 x 360	300 x 300	300 x 300	720 x 720	300 x 300	300 x 300
Installed/maximum RAM	60K/60K	35K/35K	128K/256K	128K/256K	64K/64K	48K/48K	21K/1MB
Rated speed (pages per minute), color/black or black only	1/2.5	.8/4	.5/3	.5/5	.5/3	.66/3	.4/3
Resolution enhancement	●	●	○	○	●	●	●
Consumables							
Street price of black ink or toner ¹	\$11.50	\$35 ⁴	\$26 ⁴	\$26 ⁴	\$18	\$25.50	\$25
Black ink or toner life (pages) ⁵	600	2000	640	640	865	800	1000
Street price of color ink or toner	\$8	\$38 ⁴	\$31.50 ⁴	\$31.50 ⁴	\$31	\$29	\$30
Color ink or toner life (pages) ⁵	210	200	213	213	690	273	4000
Cartridge configuration	C, M, Y, K	CMY+K	CMY or K	CMY or K	CMY or K	CMY or K	CMY or K
Design							
Specified dimensions, w x d x h (inches)	16.1 x 10 x 7.2	11.8 x 6.2 x 2.6	14.2 x 14.2 x 11	15.2 x 18.3 x 6.8	18.5 x 20.5 x 7.5	12.2 x 5.8 x 2.6	14.3 x 11.1 x 10.6
Working dimensions, w x d x h (inches) ⁷	16.1 x 21 x 7.2	11.8 x 10 x 12	14.2 x 15 x 11	15.2 x 20 x 6.8	18.5 x 23 x 7.5	12.2 x 21 x 11.7	14.3 x 22 x 14
Weight (pounds) ⁸	9.9	4.2	8.8	11	16.3	5.4	11
Monthly duty cycle (pages)	n/a	n/a	600	1000	n/a	500	2000
Reset button/incoming data indicator	○/●	○/●	○/○	○/○	●/●	●/○	●/●
Paper-out/low-toner indicator	●/●	●/●	●/●	●/●	●/○	○/○	●/●
Energy Star compliant	●	●	●	●	●	●	●
Printing power consumption (watts) ⁹	29	30	25	25	20	13.5	12
Ink or toner saving mode	○	○	●	●	●	●	●
Paper handling							
Standard/maximum paper capacity (pages)	100/100	30/30	70/70	150/150	100/100	60/60	150/150
Maximum paper size	legal	legal	8.26" x 18.5"	legal	legal	legal	legal
Output tray capacity	100	50 ¹⁰	70	150	60	50	75
Standard/maximum envelope capacity	10/10	5/5	1/1	1/1	10/10	1/1	15/15
Service and support							
Warranty (years)	2	2	2	2	2	1	2
Money-back guarantee (days)	○	○	30	30	○	○	○
Toll-free tech support	●	●	●	●	●	○	○
Weekday support (hours)	15	15	24	24	12	11	9
Weekend support/on-site service	●/○	●/○	●/●	●/●	○/○	○/○	○/●
Repair turnaround policy (days)	1	1	○	○	3	1	1
Fax/BBS	●/●	●/●	●/●	●/●	●/●	○/●	●/●



¹ Average of prices in local outlets of major computer and office supply stores.

² Includes \$80 optional sheet feeder.

³ Vendor estimate.

⁴ Includes head and replaceable ink tank.

⁵ For U.S. letter-size documents at 5 percent page coverage (black cartridges) or 7.5 percent page coverage per color.

⁶ Spot color only.

⁷ Includes output tray or stack for letter-size paper and room for cables.



Brother HL-630	Brother HL-660	Canon BJ-200ex	Digital DECwriter 90ip	Epson ActionLaser 1400	Epson ActionLaser 1500	NEC Silentwriter SuperScript 610plus	NEC Silentwriter SuperScript 660	NEC Silentwriter SuperScript 660i
MONOCHROME PRINTERS								
laser	laser	ink jet	portable ink jet	laser	laser	laser	laser	laser
\$389	\$700	\$236	\$299 ³	\$605	\$486	\$399 ³	\$599 ³	\$799 ³
300 x 300	600 x 600	720 x 360	300 x 300	600 x 600	300 x 300	300 x 300	600 x 600	600 x 600
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
500K/2MB	2MB/10MB	62K/62K	32K/32K	2MB/18MB	1MB/5MB	256K/4.25MB	256K/4.25MB	2MB/34MB
6	6	3.8	2	4	6	6	6	6
●	●	●	●	●	●	●	●	●

\$190 ⁴	\$190 ⁴	\$24	\$25	\$100	\$160	\$100 ³	\$100 ³	\$100 ³
3000	3000	500	250	4000	4000	4000	4000	4000
n/a	n/a	n/a	n/a	n/a	n/a	\$140 ³	\$140 ³	\$140 ³
n/a	n/a	n/a	n/a	n/a	n/a	4000 ⁶	4000 ⁶	4000 ⁶
K	K	K	K	K	K	K	K	K

14.4 x 14.3 x 7.2	14.4 x 14.3 x 7.2	13.7 x 21.2 x 10.7	11.6 x 5.2 x 2.5	13 x 10.5 x 10.5	14.5 x 18 x 8.9	14.6 x 14.1 x 4.7	14.6 x 14.1 x 4.7	14.6 x 14.1 x 4.7
14.4 x 24 x 15.7	14.4 x 24 x 15.7	13.7 x 21 x 11	11.6 x 9 x 11.5	13 x 19 x 18	14.5 x 20 x 8.9	14.9 x 19 x 12	14.9 x 19 x 12	14.9 x 19 x 12
16.6	16.6	6.6	4.8	17	22	17.6	17.6	17.6
3000	3000	n/a	1000	10,000	11,000	2500	2500	2500
○/●	○/●	○/○	○/○	○/○	●/●	○/●	○/●	●/●
○/●	○/●	●/○	●/○	○/○	●/○	●/●	●/●	●/●
●	●	●	●	●	●	●	●	●
480	480	30	11.5	400	600	400	400	400
○	●	○	●	●	○	●	●	●

200/200	200/200	100/100	15/15	100/100	150/400	50/200	50/200	50/200
legal	legal	legal	legal	legal	legal	legal	legal	legal
100	100	100	15	50	100	50	50	50
10/10	10/10	10/10	1/1	10/10	10/10	1/5	1/5	5/5

1	1	2	2	2	2	2	2	2
○	○	○	30	○	○	30	30	30
●	●	●	●	●	●	●	●	●
11	11	15	24	12	12	11.5	11.5	11.5
○/●	○/●	●/○	●/●	○/○	○/○	○/○	○/○	○/○
○	○	1	○	3 to 5	3 to 5	1	1	1
●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●

⁸ Includes ink or toner cartridges but not paper or cables. For portables, weights include ink cartridge(s) and AC adapter but not batteries and interface cable.

⁹ For 115V units while printing.

¹⁰ No extendable output tray, but 50 sheets will stack in front of unit.

4 Digital DECcolorwriter 520ic

Average Street Price: \$349

Maximum Resolution: 300 by 300 dpi black, 300 by 300 dpi color

Print Speed: 5 ppm black, .5 ppm color

Output Quality: Good color, text, and line art; fair gray scale

The DECcolorwriter 520ic takes fourth place among color printers with a solid combination of performance, good output quality, and economy in black printing. It was the second-fastest ink jet printer in the review. It offers nice, well-balanced color and good black output, but only fair gray-scale images. The 520ic is one of the few ink jets that let you use fan-fold paper, with an optional pin-feed attachment.

Only the power button was a problem. We had to push very hard to engage it and then hold it for at least a second or so, or the unit wouldn't stay on.

Credit the 520ic's replacement black ink tanks for this printer's low cost per page in black printing. Run ten ink tanks (at about \$5 each) through the same printhead, and your cost for printing in black can drop as low as one cent per page. To stretch your mileage even more, Digital provides an Ink Savings mode.

On the other hand, the black and color ink cartridges cannot be used together, so the blacks created with a color cartridge installed require heavy outlays of C, M, and Y. Because you must replace



the entire cartridge when any one color runs out, color costs for the 520ic were the highest in the review, at 14 cents per page.

The 520ic is a decent, efficient printer—once we got the power to stay on, that is.

5 Lexmark ExecJet IIc

Average Street Price: \$299

Maximum Resolution: 600 by 300 dpi black, 300 by 300 dpi color

Print Speed: 3 ppm black, .4 ppm color

Output Quality: Good color, text, and line art; fair gray scale

The Lexmark ExecJet IIc was one of the least expensive printers we tested—and one of the slowest. Its default background-printing mode means you get your computer back earlier, but you wait longer for output. On the up side, you'll enjoy good print quality, especially in color.



The print driver has many options for tweaking color output, and a nifty graphic shows print progress. The manual is easy to read and to the point. Paper loading is simple, but the plastic output tray seemed a little loose and not very sturdy.

The ExecJet IIc is one of the lowest-cost printers in our review and produces good output, but its relative slowness dampened its overall rating. It squeezed into fifth place in our color printer lineup.

Printer Snapshots

These printers were tested and reviewed along with the others, but they did not score high enough to reach the Top 10 Printers chart.

Canon BJ-200ex

Average Street Price: \$236

Maximum Resolution (Black): 720 by 360 dpi

Text Printing Speed: 3.8 ppm

Output Quality: Good text, line art, and gray scale

On coated paper, black text and gray scale output equals that of some low-end lasers. The flimsy paper output tray detaches from the printer too easily when being slid out, but you can simply let printed sheets stack in front of the unit.

The ancestor of this monochrome ink jet won a Best Buy in our January 1995 ink jet printer review ("Laser Quality for \$199?"). But this generation misses our Top 10 now that color ink jet printers offer more value. *Canon Computer Systems, 800/848-4123. Reader service no. 752*

Digital DECwriter 90ip

Average Street Price: \$299

Maximum Resolution (Black): 300 by 300 dpi

Text Printing Speed: 2 ppm

Output Quality: Good text, line art, and gray scale

This monochrome portable printer packs decent output quality in a small package, but you take a speed hit: The 90ip placed among the slowest of all the units we ran.

No need to bring special paper with you: the 90ip prints well on the regular stuff. Nevertheless, pitted against faster, color-capable portables it could not make the Top 10. *Digital Equipment Corporation, 800/777-4343. Reader service no. 753*

Digital DECcolorwriter 120ic

Average Street Price: \$290

Maximum Resolution: 300 by 300 dpi black, 300 by 300 dpi color

Print Speed: 3 ppm black, .5 ppm color

Output Quality: Fair color, text, line art, and gray scale

The DECcolorwriter 120ic is difficult to use. To add paper you must move, in exact order, some levers that stick out from the

printer case. To change paper sizes, you adjust a series of switches under the cover.

In our output tests we noticed intermittent banding in areas of heavy color, and black printing was so-so. You can't use black and color ink cartridges together, so you can't print true black in color mode, and color consumables cost a pretty penny.

With few advantages to begin with, the Colorwriter 120ic lost crucial ease-of-use points. *Digital Equipment Corporation, 800/777-4343. Reader service no. 754*

Epson ActionLaser 1400

Average Street Price: \$605

Maximum Resolution (Black): 600 by 600 dpi

Text Printing Speed: 4 ppm

Output Quality: Very good text and line art, good gray scale

The Action Laser 1400 printed very well, but it's the slowest laser of the lot. It shines in usability: Setup is a snap, and the clear documentation includes a short primer on laser printing theory, written for the novice. Toner loaded readily via a front access door,




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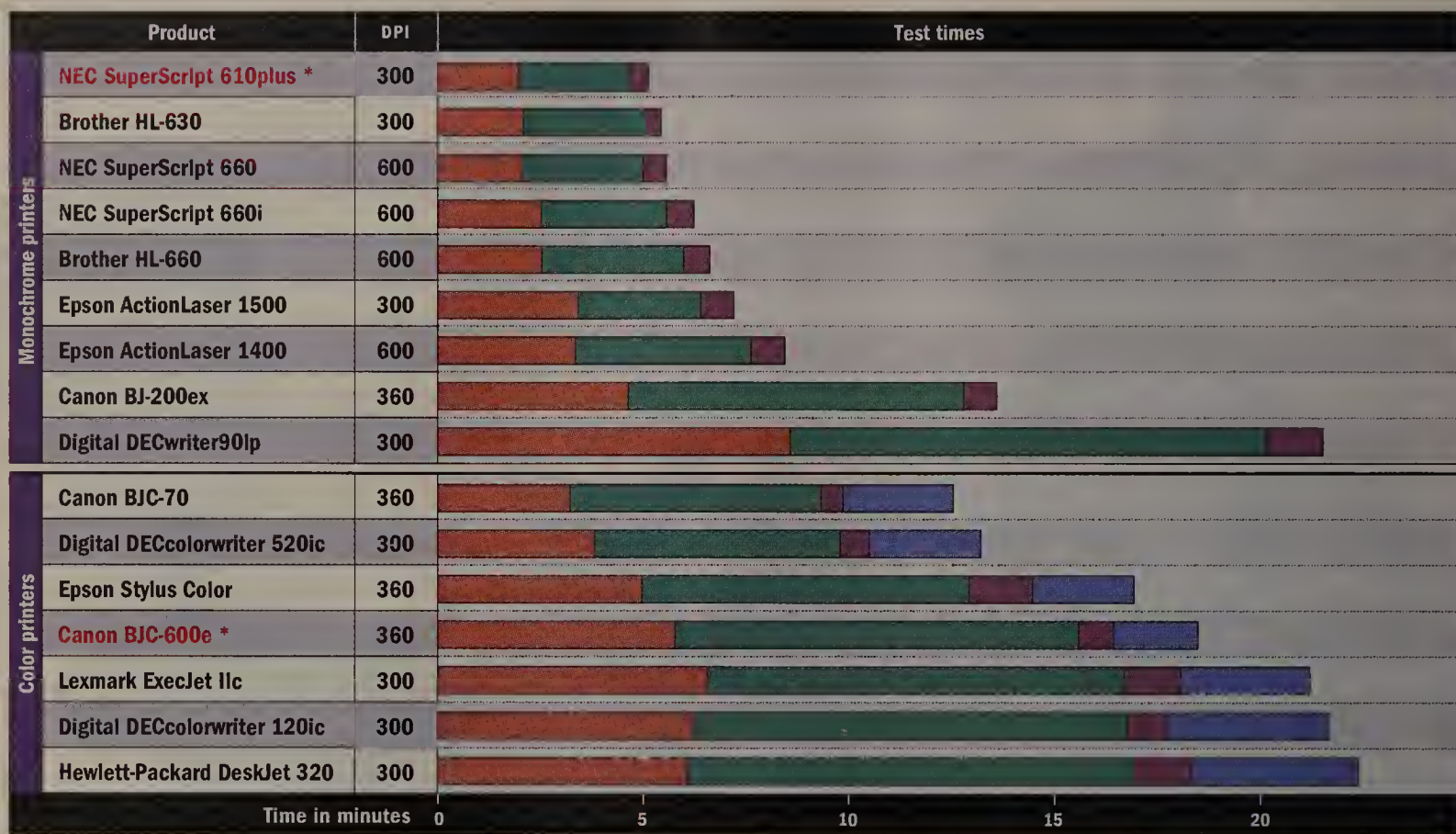
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TEST REPORT NEC and Brother Lasers Lead in Performance



* Best Buy

Printers are ordered from fastest to slowest.

Methodology

Word 6.0

We printed a one-page letter, and five- and ten-page documents with a variety of fonts and formats. We measured the total time for the documents to print.

Excel 5.0

We printed a one-page spreadsheet and a three-page spreadsheet with an embedded chart. We measured the total time for the documents to print.

CorelDraw 5.0/black and white

We printed a black-and-white page with a mixture of lines and curves of different weights, graduated shades from white to black, and a gray-scale photograph. We measured the time for the page to print.

CorelDraw 5.0/color

For the color printers, we printed a full-page color photograph. We measured the time for the page to print.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

and the starter cartridge Epson ships with the unit will print 2000 pages. Pivoting input and output paper trays on top of the printer do not eat extra desktop space.

The ActionLaser 1400 offered very good output quality and the smallest laser footprint. But it was the slowest of our 600-dpi printers, and this overshadowed its many good points. *Epson America, 800/289-3776.*

Hewlett-Packard DeskJet 320

Average Street Price: \$370

Maximum Resolution: 600 by 300 dpi black, 300 by 300 dpi color

Print Speed: 3 ppm black, .66 ppm color

Output Quality: Good color, text, and line art; fair gray scale

The DeskJet 320 offers a number of quirks in exchange for its low price. The wheels that push the paper leave vertically scored

lines that show slightly on the printed side of a page. The optional feeder has little legs you must attach to the main body. Unfortunately, we broke them when reinserting the print mechanism into the sheet feeder. The same parts were broken off in the local computer store's demo model.

Print quality was acceptable, but colors appeared slightly muted. And if we had a mostly black document with only a tiny bit of color, the ColorSmart driver still asked for a black cartridge. We had to deselect the setting to force color printing; in return we got a black that looked more like a muddy green than true black.

The DeskJet 320 is inexpensive, but it seems fragile, and the print quality did not turn heads. *Hewlett-Packard Company, 800/752-0900. Reader service no. 755*

NEC Silentwriter SuperScript 660i

Average Street Price: \$799

Maximum Resolution (Black): 600 by 600 dpi

Text Printing Speed: 6 ppm

Output Quality: Very good text and line art, good gray scale

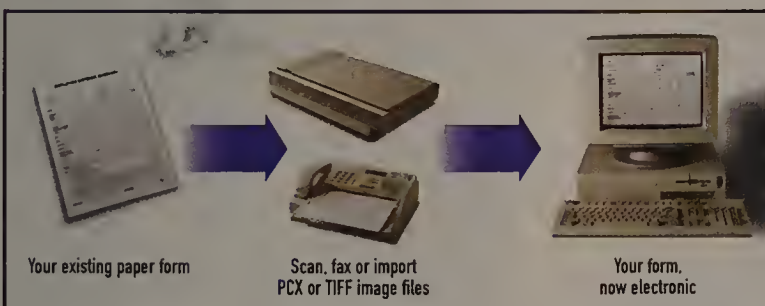
The NEC SuperScript 660i is essentially the same as the 660, but it adds a front-mounted reset switch and an internal processor. We thought the microprocessor would speed up printing, but this unit was the slowest of the family (though still very fast compared to the other lasers reviewed).

The 660i created good gray scales and some of the best 600-dpi text and line art printing we found. But its high price keeps the 660i off our Top 10. At press time we noted a \$100 price drop. *NEC Technologies, 800/632-4636. Reader service no. 756*



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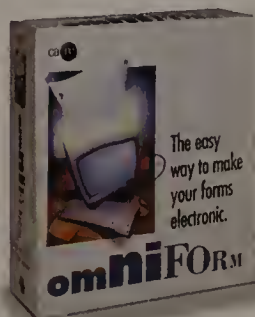
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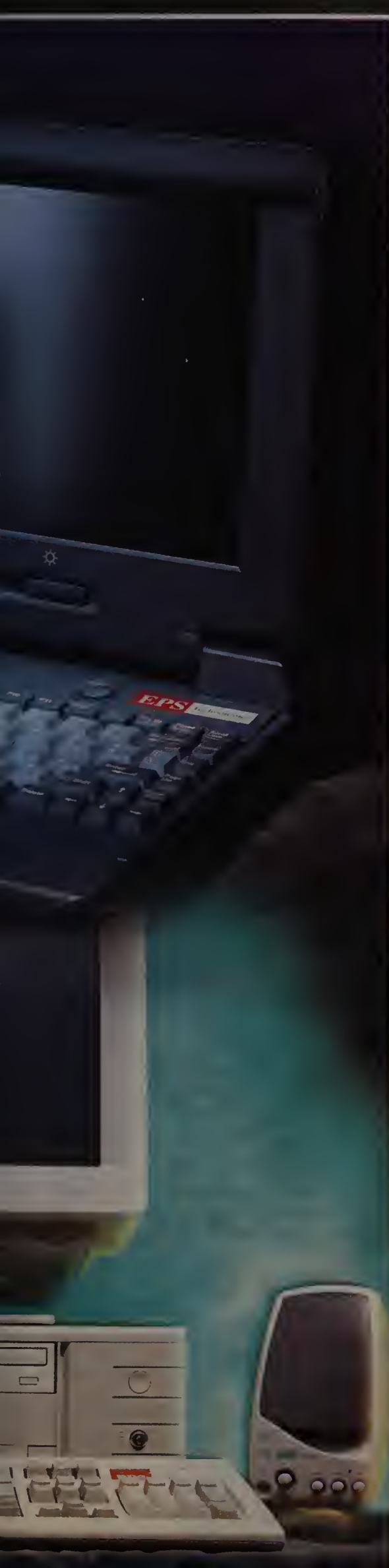


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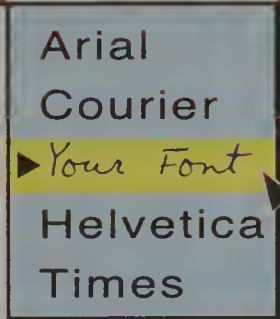
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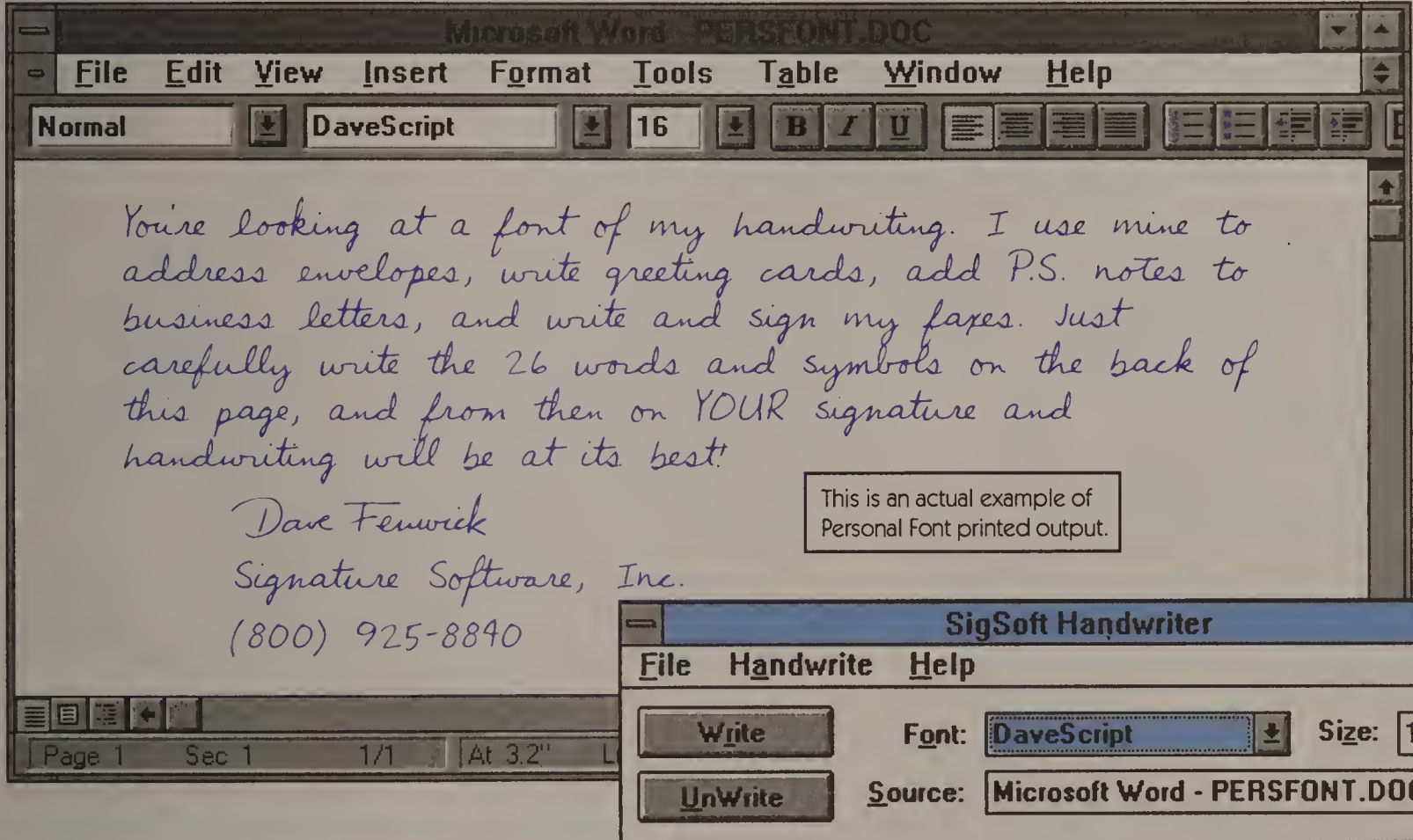
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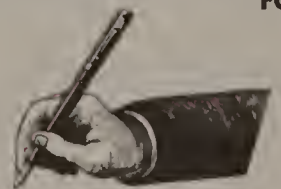
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3. Write naturally and consistently. Practice first on Signature (your name)

Name: _____ Phone #: _____

- a separate sheet of paper. Remember, what you write here will become the final font.
4. For best results use a rollerball or fibertip pen. **Do not use ballpoint pens or pencils!**
 5. Use the grid lines in the *kagvel* boxes as an aid to maintain consistent height and slant. Be sure capital letters are proportional to lower case letters.
 6. Write your capitals normally. Consider the appearance of capitals when used at the beginning of words AND when words are all capitalized. **Don't forget the punctuation!**

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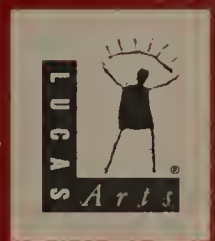
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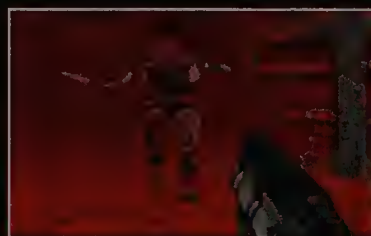


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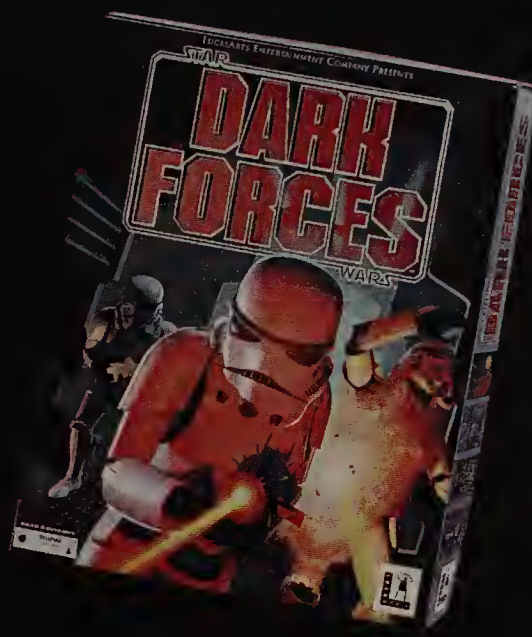
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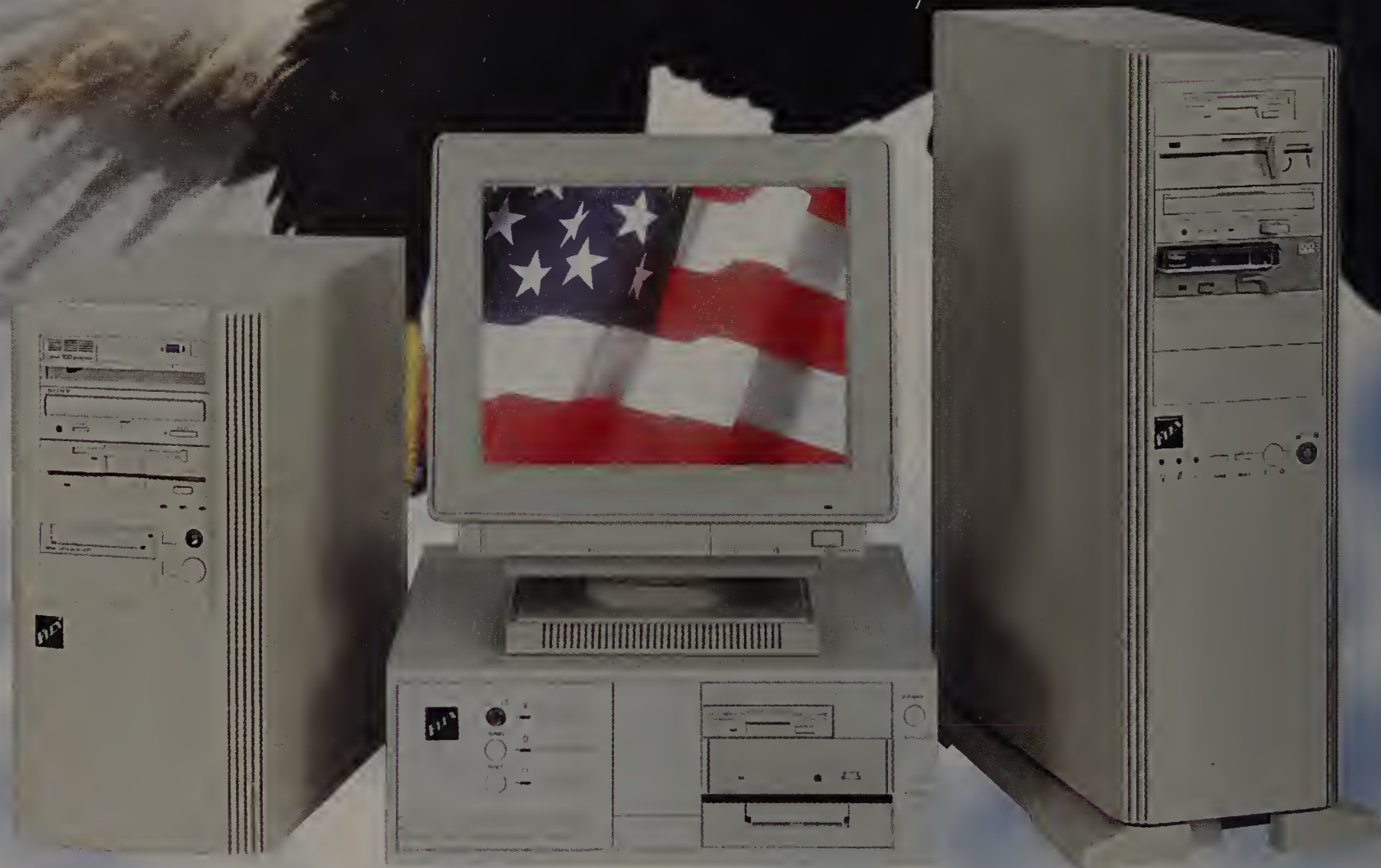


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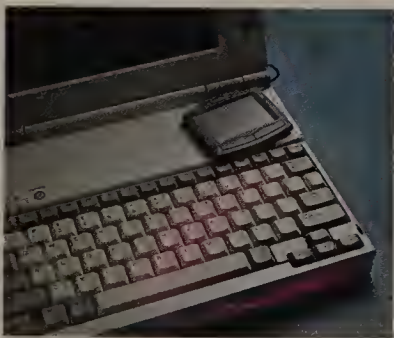
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HELP LINE Q & A



Tip of the Month

A HIDDEN COST OF WINDOWS 95: If you choose to upgrade to Windows 95, you'll need to upgrade your antivirus program as well. The typical DOS or Windows antivirus utility, particularly its memory-resident scanner component, works in a 16-bit environment and cannot detect viruses reliably in Windows 95's 32-bit environment. Although the scanner may run under Windows 95, it will report unreliable results. Furthermore, since Windows 95 doesn't let apps write directly to the hard disk, your antivirus utility can't remove viruses that infect a disk's boot sector.

Unfortunately, viruses will continue to work as they always have. Since Windows 95 does not bundle a virus scanner, you'll need to turn to a third-party utility that's compatible with it. S&S Software International (617/273-7400) will make the Windows 95 edition of Dr. Solomon's Anti-Virus Toolkit available at the same time Windows 95 ships; Symantec (800/441-7234) will also ship Norton AntiVirus for Windows 95 concurrently; and McAfee Associates (408/988-3832) says it will post VirusScan for Windows 95 on its bulletin board (408/988-4004), CompuServe (go [mcafee](#)), and America Online (keyword: [mcafee](#)) when Win 95 ships.

Shane Rau, Technical Editor

Restoring Windows' Swap File

Q I have MS-DOS 6.2 and Windows 3.1, and I recently ran into a problem after enabling 32-bit disk access. While loading, Windows informed me that I had a corrupt swap file and asked me if I wanted to delete it. I answered 'Y', then Windows continued loading. When I attempted to create a new swap file using the Control Panel's 386 Enhanced program, yet another error message informed me that I had a corrupt swap file and that I needed to set it to 'zero length', which I did. I was then able to create a new swap file and restart Windows without further trouble. Windows now runs faster, but I'm worried that things aren't quite right somewhere.

Robert W. Wilson, CompuServe

A Join the club. The combination of Windows, DOS, and your system's BIOS is such a patchwork of code, it's sometimes hard to tell why error messages like the ones you got pop up. One thing is clear, however: After you

exit Windows, your swap file is utterly expendable. Should you accidentally delete or otherwise damage it, Windows will simply give you the messages you described. Even if you manage to delete the file while Windows is running, you may see no adverse effects until you exit and restart Windows. In most cases, doing what Windows suggests (pressing **y**) will correct the situation. If corrupt swap file errors persist, you may have trashed your file system (exit Windows and run `chkdsk /f` or `scandisk /autofix` to repair it), or you may have created a permanent swap file on a compressed drive (use the Control Panel's 386 Enhanced applet to create a temporary swap file instead, or create a permanent swap file on a noncompressed local drive).

The Latest News at the Lowest Cost

Q The quantity of information available through the thousands of Usenet news groups is overwhelming. Unfortunately, so is the process of sifting through the megabytes of new

messages posted each day. Worse, my Internet access provider's clock is ticking away while I scroll through the chaff in search of online wheat. Is there a program that will let me download messages quickly, then read them offline at my leisure?

Steve Harris, Tokyo

A Like you, I've dabbled at reading Usenet news for years, but I've never managed to find a way to read news consistently without spending most of each day logged on to a UNIX server. That's too bad, because if you want to know which modems are bug-ridden, what the current market value of your old laptop is, or how to rewire your Stratocaster to make it sound like Stevie Ray Vaughn's, Usenet is an unbeatable information source. But even if your Internet access provider charges a flat rate (meaning you can remain logged on all day without racking up hourly charges), it can take hours to scroll through a day's worth of postings to just a few groups.

After looking long and hard, I've finally found a tool that makes reading—and even contributing to—Usenet doable. Forte's Free Agent offline news reader is a WinSock-compatible reader that lets you download selected news groups or individual messages (see **FIGURE 1**). Free Agent lets you grab just the article thread titles or the headers for each news group you subscribe to, and then mark those you'd like to download regularly (or sample just once) as well as those you never want to hear about again. There are also options to automatically delete messages. Free Agent lets you compose responses to news threads offline and doesn't mangle the complex header information Usenet relies on to keep messages straight. Best of all, the program is free to home users; students, faculty, or staff members of educational institutions; and employees of nonprofit organizations. You can locate Free Agent on the company's FTP server ([ftp.forte.com](ftp://ftp.forte.com)) in the `/pub/agent` directory. Unfortunately, the name of the file was not available at press time.

Naturally, Forte is hoping that you'll like Free Agent well enough to spring for the \$40 commercial version, Agent (get it?), which adds a bunch of nifty features including technical support, folders (for organizing messages you want to keep around), E-mail, a spelling checker, and, importantly, *killfiles* (also called *bozo filters*, which let you screen out messages by subject or sender). You can purchase the product online from the company's Web page (<http://www.forteinc.com/forte/>) or order it on disk by phone.

- **Free Agent** (freeware), **Agent** \$40; Forte Inc.; 619/431-6496
Reader service no. 707

To Serve a Modem

Q We have a three-computer Windows for Workgroups installation in our home. I'd like to use one of the PCs, which lacks a modem, to access

the Internet using the modem on the server. Does Windows for Workgroups provide some way to share modems? If not, is there a utility that does?

Chris Kopenc, Internet

A Windows for Workgroups' Microsoft Fax feature does let you share the fax part of a fax-modem over the network, but it doesn't support sharing for data transmission. However, I've found a freeware application from Germany called Recomm that lets you share your modem with other Windows users across a NETBIOS network (such as Windows for Workgroups). The program doesn't work with DOS programs or Windows 95, and dialog boxes appear in German (but C++ source code is included if you'd like to translate and recompile). You can find the program in the file `recomm.zip` on PC World Online. Unzip the contents into a temporary directory using the command `pkunzip -d recomm.zip` (which re-creates on your disk the directory structure inside the .zip file). You'll find the rest of what you need to know to install Recomm—in slightly fractured English—in the file `readme.eng`.

How to Set Up a PS/1

Q I am having trouble with my IBM PS/1 286 (probably a Model 2011), which I purchased secondhand with MS-DOS 6.22 installed. Recently I looked at some utilities that claim to back up CMOS values. I loaded and then exited each of the utilities without changing my CMOS settings, or so I thought. Now I find my PC booting up to an IBM menu screen and running IBM PC-DOS 4.0, which appears to load from ROM, instead of MS-DOS 6.22. The worst part is that I had compressed the system's hard disk with DriveSpace, which IBM's older DOS doesn't recognize. I can't seem to find a way into the CMOS setup program, and I've lost track of the person who sold me the system, so I can't ask

USER GROUP OF THE MONTH

Portland PC Users Group

August's user group tips come from the Portland PC Users Group. Meetings begin at 6:45 p.m. on the second Wednesday of the month at the NW Service Center, 1819 N.W. Everett, Portland, Oregon. The meeting opens with a brief report from special interest group (SIG) leaders and club council members, followed by a guest speaker presentation and a question-and-answer session; it concludes with an open forum. The group provides low-cost classes in computer basics. A monthly magazine, *Portland Computing*, contains group news and events, SIG reports, reviews and articles by members, and a calendar of events. There are SIGs for DOS, OS/2, Ami Pro, and hardware. The group's BBS offers over 5GB of shareware and public-domain software.

For more information, contact Mark Peden, president, Portland PC Users Group, 921 S.W. Morrison #545, Portland, OR 97205, or call 503/226-4143. General meetings are open to the public; the annual membership fee is \$36.

Reader service no. 709

BYE-BYE TEMP FILES: The Temp directory for Windows temporary files fills up and wastes hard disk space. To clean it out automatically, put these lines in your `autoexec.bat` file:

```
set temp=c:\temp
deltree /Y %temp%
md %temp%
```

Kurt J. Baney
Portland PC Users Group



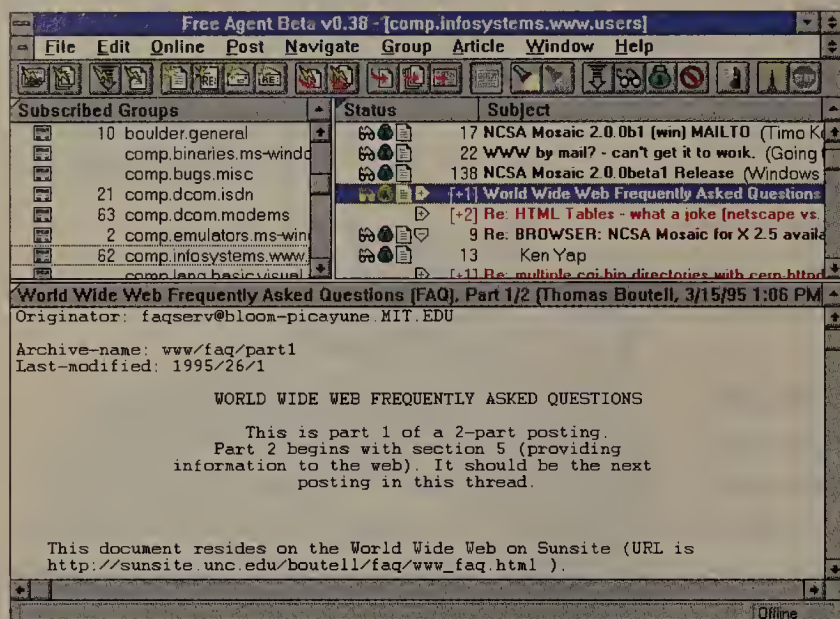


FIGURE 1: GET A HANDLE ON Usenet's information cornucopia with Forte's powerful offline news reader, Free Agent.

him how he managed to get MS-DOS 6.22 installed. Please help me undo the damage—IBM no longer provides free telephone support for this system.

I. Downie, Richardson, Texas

AYour situation may sound bad, but it's actually easy to remedy. IBM did in fact build DOS into the ROMs of several PS/1 models (2011 and 2121), and the computer's CMOS setup program has an option for booting from

the ROM's DOS or from the hard disk's version. Somehow, one of those CMOS backup programs changed that setting to the ROM-based booting option.

Most PC BIOSs either respond to one of several common keys (like <Delete>, <F1>, or <F2>) or display a message during a cold boot that tells you how to access the ROM-based CMOS setup utility. Unfortunately, the PS/1 works differently—you need to run two utilities from the DOS prompt to reconfigure your system. You can download an archive file containing the utilities, **customize.exe** and **configur.exe**, two ways: from IBM's own BBS on CompuServe in the **patch/fix/utilities** section of the IBM Aptiva and PS/1 Forum library (**go ibmps1**); or from IBM's private PS/1 and Aptiva support conference, the IBM Connection, on America Online (keyword: **ibmconnection**). There are two self-extracting archive files containing machine-specific versions of the utilities. Look for **2011cn.exe** if you have a Model 2011, and **2121rc.exe** for a Model 2121.

- **IBM BBS;** 919/248-3540

Upgrade for a Slow Laptop?

QI have a 386SL laptop that has served me well, but now I'm wishing it had a coprocessor and better all-around performance. I see these processor upgrade chips at the stores—will they work in my system? I'm not particularly concerned with power conservation—I'm plugged into the AC adapter 95 percent of the time.

Steve Remer, Internet

AI'll try to make this as quick and painless as I can: You're out of luck (more on this later). It's true that some processor upgrades for desktop systems can be downright cheap—386-to-486 upgrades and 486 clock doublers sell

for less than \$200. And in most cases, you can do it yourself in minutes; just yank the old processor, plug in the new one, and boot back up. However, most laptop manufacturers solder the processor directly to the system board, so upgrading involves sending the system to a company that specializes in that kind of surgery. Houston's Laptop Solutions can extend the life of most portables with processor, memory, and hard disk upgrades. Most of its 386-to-486 processor upgrades cost about \$350. But even if you think it's worth the money to give your current system a new lease on life, it may not be possible. For a number of reasons, upgrade chips aren't available for many processors, including your system's 386SL (see **FIGURE 2**).

In general, I recommend selling or trading in an old laptop as soon as possible (before its market value goes completely down the tubes) and buying an inexpensive (\$1000 to \$1500) 486-based model. Sure, you can turn, say, a tired old 386SX into a fire-breathing 486, but after adding memory and a larger hard disk, you may end up shelling out just as much money as if you traded in your old workhorse. More important, you'll never be able to add many of the features newer systems offer, such as PC Card (formerly PCMCIA) slots, integrated pointing devices and power supplies, longer-lasting batteries, and color displays. It's also worth noting that swapping your laptop's innards voids its warranty, although Laptop Solutions provides a warranty for the parts it installs.

- **Laptop Solutions Inc.;** 800/683-6839, 713/556-5051, 713/556-5035 (fax)
Reader service no. 708

By Scott Spanbauer

PC WORLD online The files from this article are available via PC World Online on America Online and CompuServe. Scott Spanbauer is a contributing editor for PC World. Help Line welcomes your questions and pays \$50 for published items. See page 12 for contact information.

Laptop Solutions Upgrade CPUs

If your system is based on a	Laptop Solutions can upgrade it to a
386SX	
16 MHz, 20 MHz, 25 MHz	Cyrix 486SRx or 486SRx ²
386DX	
any speed	Cyrix 486DRx or 486DRx ²
IBM 486SLC	
any speed	Cyrix 486SRx ²
486SX and 486DX	
25 MHz, 33 MHz	Intel or AMD 486DX2 or DX4, Pentium OverDrive
486DX2	
any speed	Intel or AMD 486DX2 or DX4, Pentium OverDrive
DX4	
75 MHz, 100 MHz	Pentium OverDrive (by late 1995)

FIGURE 2: THIS TABLE LISTS CPU UPGRADES available from Laptop Solutions. Note that although you can upgrade most SL-enhanced 486s, you'll forfeit some of your laptop's power management features.

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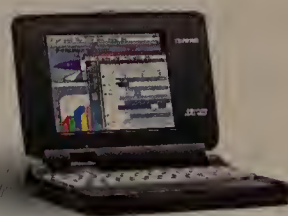
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SPREADSHEETS Q & A

Opening Files in 1-2-3 (and Creating Custom Toolbar Icons)

Q Many of my company's users save their 1-2-3 release 4.0 and 5.0 worksheets with special file extensions instead of the usual .wk4. Is there a way to change the File Open default so that the dialog box shows all files (*.*) instead of just 1-2-3 files (*.wk*)?

Innocent Lau, St. Louis

A While you can't make the regular File Open dialog box show all files by default, you can use a Classic macro to do the job. Then for maximum convenience, assign the macro to a custom icon on your default SmartIcon toolbar,

and users can choose from a list of all files with a mere click of the mouse.

To set it up, follow the steps shown in **FIGURE 1**. The macro shown in step 3 executes the Classic, DOS-style File Open command to display all files in the current directory.

To open a file using your new icon, click the new tool to see a list of files. Use the arrow keys to select a file, and press **<Enter>** to open it. To abandon the command without making a selection, press **<Esc>** until the menu disappears. To select files from a different directory, select **Tools • User Setup** and enter a new path in the Worksheet Directory field. This path becomes the default.

Adjusting Column Widths in Quattro Pro Reports

Q When I tried to print my Quattro Pro worksheet, some of the numbers that looked fine on the screen showed up as asterisks on the printed page, indicating that the column width was too small to display the values. I tried widening the column on the screen but found that it had no effect on the printout. What's going on here?

Judy Kelly, Boston

A After talking with you a little further, Judy, I discovered that you had dragged the pane splitter to divide your worksheet window into two panes; this allows you to view sheets A and B simultaneously on the screen. The numbers you wanted to print were on sheet B, which was visible in the bottom window.

Here's the scoop: Although you can change column widths in either pane, Quattro Pro uses the column widths of the top (or left) pane to format the report. So the solution is simple: Select **View • Panes • Clear** (or click on the pane splitter and drag the window down or to the right like a shade) to

1 Select **Tools • SmartIcons** and click **Edit Icon**.

2 Select the regular **File Open** icon under Available icons (the description reads 'Open an existing file') type the file name **openall** in the dialog box, and press **<Enter>**.

3 Enter the macro **/foa*. * ~ {name} here**.

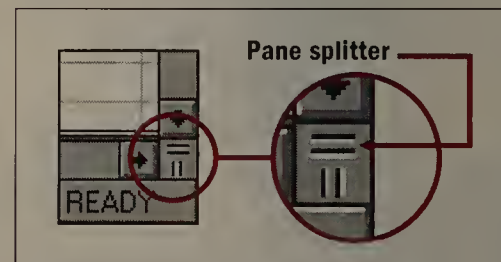
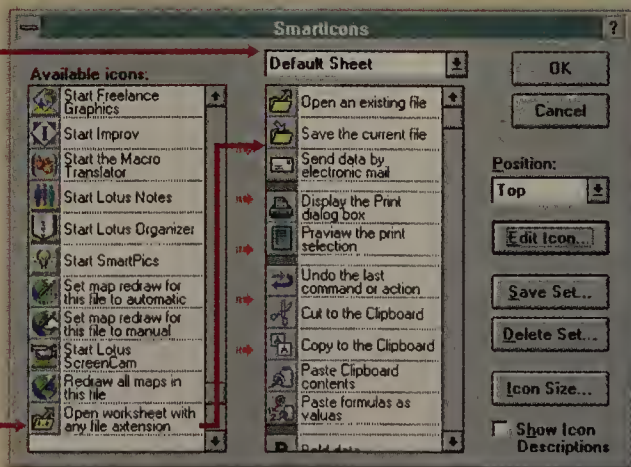
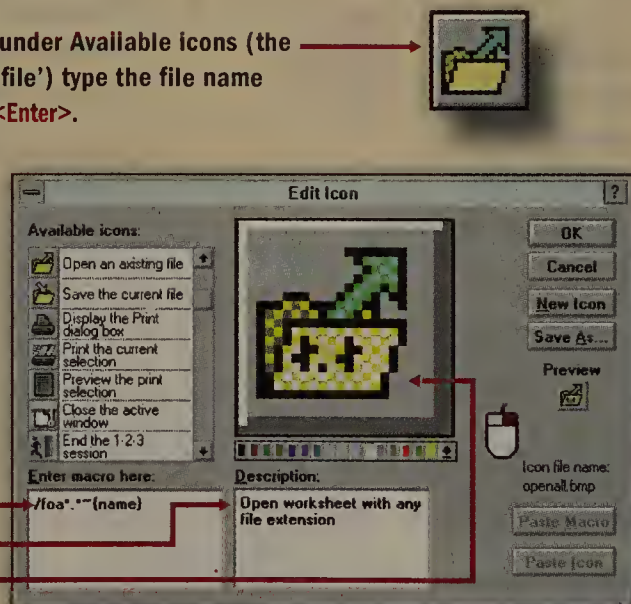
4 Enter a description such as **Open worksheet with any file extension** here.

5 Click the enlarged representation of the File Open icon and modify it to create an icon that looks different than the regular File Open icon. (You might draw **In *.*** on the icon's file folder, as shown here.) Click **OK**.

6 Click the arrow at the right of the drop-down list box and select the toolbar you want the icon to appear in.

7 Find your new icon at the bottom of the Available icons list, drag it into position in the toolbar column, and click **OK**.

8 To display all the files (*.*) in the default directory, click the newly created button on its toolbar.



clear the panes, then adjust the column widths and preview your report. Later, reset the panes as you need them to view the worksheet on screen, and remember that changing the column width in the bottom (or right-hand) pane won't affect your reports.

Summing the Top Values in Any Spreadsheet

Q Is there any convenient way to add up the largest *n* values in a range? For instance, how would I do this to

FIGURE 1: HERE'S HOW TO SHOW ALL THE FILES instead of just those with the *.wk* extension, in a 1-2-3 for Windows directory. Create your own custom icon, too.

compute the total sales volume of my company's top four salespeople?

Stephen Dobrow, Woodside, New York

That depends on which spreadsheet you're using, how your data is arranged, and what you'd care to call "convenient." I've come up with three different ways of doing it: a general method that works for any current Windows spreadsheet; a rather tricky approach that works well for 1-2-3 releases 4 and 5, as long as the data is arranged in a single-column list; and an elegant array formula for Excel.

FIGURE 2 illustrates the 1-2-3 solution. The formula in cell B2, shown summing the largest four values in the range A5..A15, is `@dsum(A4..A15,0,+A5>=@large(A4..A15,B1))`. This formula employs the database function `@dsum`, which adds numbers from a list that satisfy a specified criterion. The criterion, in turn, uses the `@large` function to determine how many numbers to sum. Note that this setup requires that the values be arranged as a database. They must be in a single-column range with an arbitrary label (in this case in cell A4), to serve as a field name, even though that name doesn't appear anywhere in the formula. Also note that the `@large` function requires absolute cell addresses.

If the list is arranged horizontally, however, the `@dsum` trick won't work. FIGURE 3 shows an alternative solution that you can use with 1-2-3 releases 4 and 5, Quattro Pro 5 and 6, and Excel 4 and 5. The data is shown in range B4..L4. A series of `@if` formulas in range B5..L5 picks out the four largest values from the list; the formula in cell B5 is `@if(@rank(B4,B4..L4)<=B1,B4,0)`. (If you set up the example, enter the formula in cell B5 and copy it to range C5..L5). In this formula, the `@rank` function returns the rank order of cell B4 in the list. The `@if` function returns B4 if that rank order is higher than that of the index in cell B1; otherwise `@if` returns zero. The formula in cell B2 is `@sum(B5..L5)`.

Excel's array formulas allow you to

	A	B
1	Items to sum	4
2	Sum	2953
3		
4	Data	
5	4	
6	230	
7	307	
8	289	
9	122	
10	906	
11	285	
12	867	
13	772	
14	408	
15	148	
16		

FIGURE 2: SUM THE TOP VALUES in a vertical range like this one by using a handy 1-2-3 formula.

collapse the last two formulas into a single cell. With the list of values in range B4:L4 and a 4 in cell B1, the formula `{=sum((rank(B4:L4,B4:L4)<=B1)*B4:L4)}` gives the sum of the four largest values in the list. Type in the formula without the curly brackets, then press `<Ctrl><Shift><Enter>` to enter it as an array. In this formula, the `rank` function computes an array of rankings; comparing these with B1 yields an array of true or false values. Multiply the resulting array by the original list to get an array of values in the top four. The sum function totals them up.

Excel Range Names Goof in February

Well, gentle readers, it's time once again to live and learn. Several of you kindly wrote in to point out that the formula in cell B14 for calculating weekly shift rotations was incorrect ("Calculating Employee Shifts in Excel," February). When you copied it to create the shifts table, it failed to adjust properly, so that every week

showed the same shift rotations (not good for company morale).

How could this happen? By substituting the range named `ThisWeek` for the cell address `B$13` during the editing process, we ran afoul of Excel's ticklish range naming system. Here's the principle: By default, Excel's range names refer to absolute cell addresses. Thus, when you select, say, cell B13 on sheet 1 and use `Insert•Name•Define` to name it `ThisWeek`, the name reference defaults to `Sheet1!B13`. This makes sense: Copies of the formula that include the name `ThisWeek` will always refer to cell B13.

But to allow the formulas that include names to shift their references (which is the usual state of affairs when you are copying formulas), you must be careful to edit the name reference so that it can change. And you must do it *with the active cell in the proper location*, because relative name references in Excel are defined with respect to the active cell. In this case, we should have carefully selected cell B13, then selected `Insert•Name•Define` and edited the entry in the 'Refers to:' box so that it read `Sheet1!B$13` instead of `Sheet1!$B$13`. By deleting the dollar sign in front of the B, you make sure that when the name appears in a formula in column C, the name refers to C13; in column D, it refers to D13; and so on. Simple, eh?

By Richard Scoville

Richard Scoville is a contributing editor for PC World and a software training consultant based in Chapel Hill, North Carolina. Spreadsheets welcomes your questions and pays \$50 for any published items. See page 12 for contact information.

B5:B5		=IF(@RANK(B4,\$B\$4..\$L\$4)<=\$B\$1,B4,0)										
	A	B	C	D	E	F	G	H	I	J	K	L
1	Items to sum	4										
2	Sum	2953										
3												
4		4	230	307	289	122	906	285	867	772	408	148
5		0	0	0	0	0	906	0	867	772	408	0

FIGURE 3: USE A HORIZONTAL LAYOUT to sum the top values in other spreadsheets. The formula in cell B5 finds the four largest values, and the one in B2 sums them.

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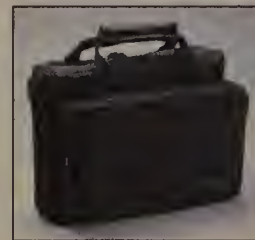
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WORD PROCESSING Q & A

Word Counts in the Big Three

Q I can't seem to find a word processing program with a word count feature. For the type of writing I do, an accurate word count is a must. I'm currently using PFS:Window Works 2.0. Can you recommend any up-to-date word processors that have this feature?
Sinatra Scott, Seattle

A No problem. All three of the major Windows word processors provide accurate word counts. Here's how to get them in all three programs:

Word 6.0 for Windows: Select *Tools • Word Count*.

WordPerfect 6.x for Windows: Select *File • Document Info*.

Ami Pro 3.x: Select *File • Doc Info*, then click the *Update* button.

Simple, no?

A File Name on Every Page in WordPerfect 6.x

Q Is there a way to force WordPerfect 6.0 for Windows to print the name of the current file on every page of the document?

Steven Dobrow, Woodside, New York

A WordPerfect handles this job easily.

First, open the document and select *Layout • Header/Footer*. Choose one of the Header or Footer options in the Select list, and click *Create* to insert it in your document. WordPerfect will create a new toolbar at the top of the screen (see **FIGURE 1**). To insert the file name into your header or footer, select *Insert • Other*, then either *Filename* or *Path and Filename*. Depending on whether you chose a header or a footer, your document's file name, with or without the full path, will appear at the top or bottom of the page.

Use the other buttons on the Header and Footer toolbar to format the text, add page numbers or lines, and adjust the element's position on the page. When you're done, click *Close* to resume editing your document. That's all there is to it.

Faster WordPerfect Spelling Checks

Q When I want to check the spelling in a WordPerfect 6.0 document, I have to select *Tools • Speller*, then click the Start button inside the Speller dialog box before it will look for the first

misspelled word. That seems like it shouldn't be necessary. Is there some way to begin the spelling check without this extra step?

Rivka Dunninger, New York

A WordPerfect works that way so you can set options for the spelling check before it starts. However, to start the check automatically, select *Options • Auto Start* in the Speller dialog box, then click *Close*. From now on, whenever you do a spelling check, WordPerfect will automatically find the first word not in its dictionary, without expecting you to click a button first.

Dodging Bullets in WinWord 6.0

Q Whenever I use the bulleted-list button on the Word for Windows toolbar, it inserts a clock face instead of a normal bullet character. I can use the *Format • Bullets and Numbering* command to change the bullet, but the next time I click the button, it produces the same clock-face character. How do I fix this weird default setting?

Michal Horace, St. Louis

A When I first looked at this question, I thought it would be easy to answer. But it turned out to be more complicated than I expected. Usually when you change an option in WinWord, the program saves your selection as the new default; not so with bullet characters. Solving your problem is going to require a little detective work on your part.

It looks like WinWord is substituting the clock-face character from the Windows WingDings collection for the bullet character from the Symbol TrueType font it normally uses. The most likely cause is that the Symbol font got removed. To find out, click on WinWord's drop-down font list and look for the Symbol font. If it's not there, you'll need to reinstall it. To do so, launch Windows' Control Panel and double-

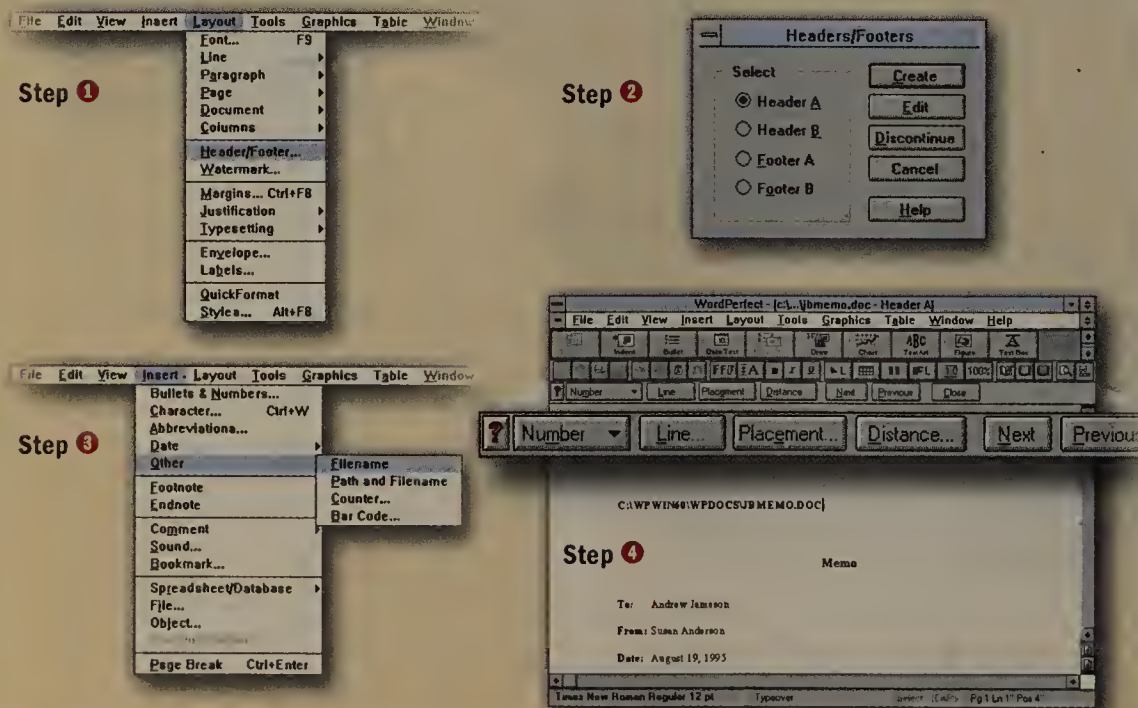


FIGURE 1: NAME THAT DOCUMENT. To print the file name on every page of a WordPerfect 6.x for Windows document, simply follow the steps shown above to add it to the header or footer.

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click the *Fonts* icon. Click *Add*, change to the windows\system directory in the Add Fonts dialog box, choose *Symbol (TrueType)*, and then click *OK*.

If you can't find the Symbol font in this list, you'll have to reinstall Windows from scratch. This is actually easier than trying to reinstall just part of the program, and it won't cause you to lose any of your current Windows settings. Just pop the number 1 Windows disk into a floppy drive, type **setup** at the DOS prompt, and follow the on-screen instructions.

If the Symbol TrueType font *does* appear in your WinWord font list, your problem is more serious. In that case, WinWord's winword.opt file may be fouled up. This file contains customized menu settings, dialog box defaults, and other options specified by the user. The solution is to exit WinWord and delete this file, which is typically found in the main WinWord directory. When you restart WinWord, it generates a new copy of winword.opt using the original default settings, including the normal bullet characters. But if you've changed any other WinWord defaults, you'll have to recreate them using the program's *Tools • Options* dialog box.

A Portable WinWord Dictionary

Q I use WinWord 6.0c on both my desktop computer and my notebook. I'd like to transfer my AutoCorrect and custom dictionary entries from my desktop to my portable so I can have the same corrections available without having to reenter everything. Do you have any suggestions?

*Adam Couture,
Hopkinton, Massachusetts*

A Sure. All you have to do is find the correct files on your desktop's hard disk and copy them to your notebook. The trick is figuring out where WinWord stores the files you need.

WinWord keeps the AutoCorrect entries in its normal.dot template, which you'll usually find in the winword\template directory. The file where WinWord stores your custom dictionary entries, custom.dic, can be trickier to find. That's because where it's stored depends on whether you installed WinWord as a stand-alone pro-

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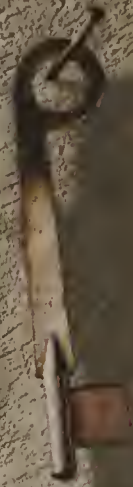
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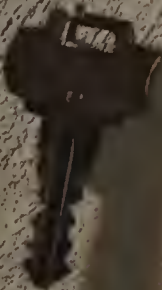
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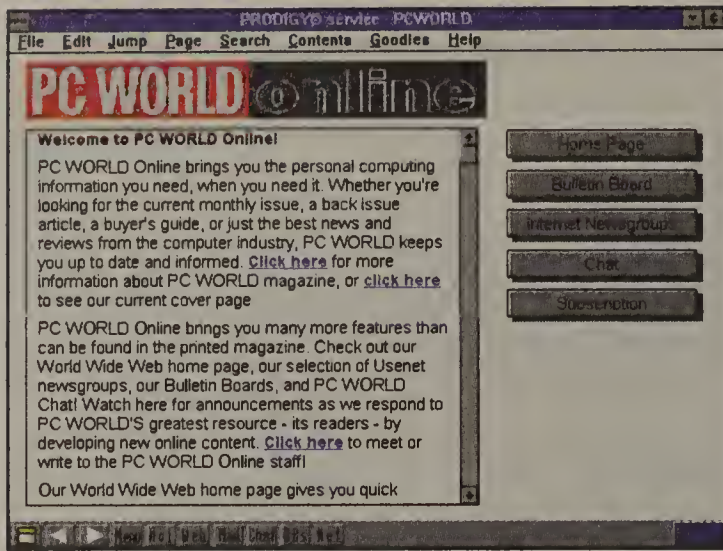
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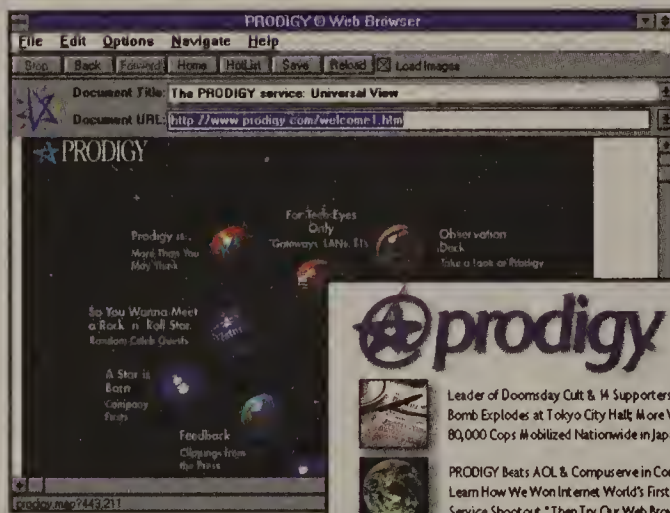
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gram or as part of Microsoft Office. To locate the file, first try your winword directory. If it's not there, check the windows\msapps\proof directory.

If all else fails, you can use Windows' File Manager to find the file. Launch the utility, select *File•Search*, and in the Search For box type **custom.dic**. In the Start From box, type the name of the root directory you want to search, check the *Search All Subdirectories* option box, and click *OK*. After searching your hard disk, File Manager should display a window indicating the location of the file.

Once you've found both files, you can copy them to a floppy, then transfer them to your portable PC. Because you'll want to overwrite the corresponding files on your notebook's hard disk, you'll need to copy them to the right directories. (Just remember that anything you've already entered into your notebook's AutoCorrect file will also be overwritten.) Follow the steps outlined above to find out where the files are stored on your laptop.

One last note: If you've never added a word to WinWord's custom dictionary on your notebook, custom.dic won't exist. You should add at least one word to create the file on your notebook, so you'll know where it should go.

Weird Search and Replace in Ami Pro

Something very frightening happened to me the other day when I was using Ami Pro 3.1. I was editing a document created by a co-worker who had used two asterisks (**) instead of bullets in a list. I selected the text, then applied a bullet style to it for a better appearance. To get rid of the asterisks, I then selected *Edit•Find & Replace*, typed two asterisks in the Find box, left the Replace With box blank, and clicked *Replace All*.

What happened then wasn't at all what I expected. Instead of stripping out the asterisks, Ami deleted all the text in the document; I wasn't able to recover it at all, even when I tried the *Edit•Undo* command. As a result I lost a great deal of work. What happened here, and is there any way to search for asterisks and replace them without courting disaster?

Julian Goldman, Wichita, Kansas

I can understand your dismay. It seems you've found out the hard way that Ami Pro uses the asterisk character (as well as the question mark) as a wild card in searches. If you enter either character alone in the Find box, then select *Replace All*, any text beyond the cursor goes into the bit bucket. It's alarming, to say the least.

The solution is to surround those characters in the Find & Replace dialog box with angle brackets, as in `<*>` or `<?>`. You must surround each wild-card character separately so that Ami Pro knows to treat each one as a character, not as a wild card.

First, make sure the cursor is at the top of the file. Then perform the search as you normally would: Select *Edit•Find & Replace*, type each asterisk surrounded by angle brackets, and leave the Replace With box blank. Now click the *Options* button and make sure the *Whole Word Only* check box is unmarked. That way Ami is sure to catch every occurrence of these characters. Finally, select *Replace All* to strip out those nasty asterisks—without deleting everything else in your document.

Subtracting Ads From Ami Pro

I like Ami Pro 3.1, but like a lot of other Windows programs, it displays a logo screen at start-up. I already know I'm using Ami Pro and don't really need to be reminded. Is there a way to disable this pointless display?

Phyllis Green, Denver

Yes. Unlike with many Windows programs, Lotus makes it easy to get right to the program without the advertising display. In Program Manager, highlight the *Ami Pro* icon, then select *File•Properties*. In the Command Line field, position the cursor at the end of the existing text. Press `<Space>`, then type `/L`. This modest change will eliminate the logo and make the program load a little faster.

By George Campbell

George Campbell is a contributing editor for PC World and a contributor to The PC Bible (Peachpit Press, 1994, 800/283-9444). Word Processing welcomes your questions and pays \$50 for published items. See page 12 for contact information.

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WINDOWS 95 ADVISER

Priming your PC for Windows 95? Maybe you should think about cleaning up your hard drive first, since Windows 95 needs plenty of room—about 25MB for a typical installation. And hard drives aren't so easy to clean. Delete the wrong file and... Enough said.

Assuming you install it over your previous version of Windows (as Microsoft recommends), Windows 95 will do some of the cleaning for you, removing obsolete Windows and DOS files. It either copies the new over the old—replacing your old gdi.exe with the new version, for example—or, if a file name has changed, it copies the new and deletes the old. For instance, Win 95 installs mspaint.exe (Paint) and deletes pbrush.exe (the old Paintbrush).

But Windows 95 is an inconsistent housekeeper that may leave up to 12MB of practically obsolete DOS

and Windows files scattered over your hard disk. This month I'll show you which Windows files you can safely delete to reclaim your disk space—both before you install Win 95 and after. Next month I'll cover which DOS files are expendable.

A Clean Machine

Let's look at the kinds of files you can purge. (The deletable files are listed in the table "Housecleaning Guide: Files You Can Lose".)

• **Files that Windows 95 won't delete on its own.** Take Terminal, Windows 3.x's

bare-bones communications program, whose file name is terminal.exe. Now it's called HyperTerminal, and the file name is hypertrm.exe. Although Win 95 installs HyperTerminal by default, it

doesn't delete terminal.exe. So it leaves two versions of this program on your hard disk—and wastes 180K of space in the process.

Mail and Fax—two applications that came with Windows for Workgroups—pose a similar problem. Windows 95 doesn't install Exchange (the replacement for Mail) or the new Fax by default. But if you do install them, the file names differ from the Windows for

Windows 95 is an inconsistent housekeeper; it may leave up to 12MB of obsolete DOS and Windows files scattered over your hard disk.

Workgroups versions, and Windows 95 doesn't delete the old application files. So again, you're left with two versions. Similarly, the old Windows Backup has been replaced by a new version, but it

Housecleaning Guide: Files You Can Lose

Files Windows 95 won't delete on its own

Fax	awcas.dll	awclass1.dll	awclass2.dll	
	awfaxio.dll	awfxprot.dll	awt30.dll	
	dllsched.dll	efaxdrv.drv	efaxpump.dll	
	efaxrun.dll	fax.cpl	faxcover.dll	
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	Mail	impexp.dll	mail.wri	msmail.exe
		msmail.hlp	wgpomgr.dll	
Terminal	terminal.exe	terminal.hlp		
Windows Backup	mwbackf.dll	mwbackr.dll	mwbackup.exe	
	mwbackup.hlp	vfintd.386		

Files Windows 95 will delete only if you install new versions

Character Map	charmap.exe		
Chat	ringjn.wav	ringout.wav	winchat.exe
	winchat.hlp		
Clipboard	clipsrv.exe	clipbrd.exe	clipbrd.hlp
	clipbrd.ini		
Hearts	cards.dll	mshearts.exe	mshearts.hlp
Minesweeper	winmine.exe	winmine.hlp	
Netwatcher	netwatch.hlp	netwatch.exe	
Network DDE	nddeapi.dll	nddenb.dll	netdde.exe
Solltaire	sol.exe	sol.hlp	
Windows Popup	winpopup.hlp	winpopup.exe	

Features dropped from Windows 95

Windows Antivirus	mwavabsi.dll	mwavdlg.dll	mwavdosl.dll
	mwavdrv.dll	mwav.exe	mwav.hlp
	mwavmgr.dll	mwavscan.dll	mwavsos.dll
	mwavtree.dll	mwavtsr.exe	mwgrafic.dll
Calendar	calendar.exe	calendar.hlp	
Cardfile	cardfile.exe	cardfile.hlp	
Clock	clock.exe		
Recorder	recorder.dll	recorder.exe	recorder.hlp
Schedule +	msremind.exe	mssched.dll	schedmsg.dll
	schdplus.exe	schdplus.hlp	trnoff.dll
	trnsched.dll		

Orphan files

ab.dll	cmc.dll	cpqgr3.exe
cpqvga.gr3	demilayr.dll	framewrk.dll
glossary.hlp	hpeisa.386	hpisa.386
lm21drv.upd	mach.3gr	mailmgr.dll
mailspl.exe	mssfs.dll	ncdw.dll
pabnsp.dll	progman.hlp	rasmac.386
rmm.d32	sconfig.dll	sendfile.dll
smc8000w.386	sound.drv	store.dll
tim17521.wpd	v7vga.3gr	vddsvga.386
vddxga.386	vforms.dll	vga.3gr
vpmt.386	wfwaudit.dll	wfwnet.cpx
wfwnetcp.hlp	win.cnf	winfile.hlp
write.hlp	xga.drv	

leaves the old version on your disk.

If you don't use Terminal, Mail, Fax, or Backup, delete their files right now—don't even wait for Windows 95 (again, see the table). But if you do use any of these apps, you'll have to be more patient; once you install Windows 95 and have the new versions of these apps working, then you can delete the old ones.

• **Files Windows 95 will delete only if you install new versions.** Windows 3.1 automatically installed loads of accessories, such as Hearts, Character Map, and Solitaire. Windows 95 offers these add-ons, too, but you have to specify that you want them installed. The good news is that you won't get them if you don't want them. The bad news is you'll still have the old Windows versions on your hard drive. Again, if you don't use these files, delete them now. If you do choose to install an accessory, however, Win 95 will remove the old version for you.

• **Features dropped from Windows 95.** Some golden oldies, like Clock, aren't included with Windows 95, and the program

doesn't delete them—but you can if you don't use them.

• **Orphan files.** "Orphans" are files that Windows 95 leaves untouched on your hard drive but doesn't use. For example, Windows 95 includes a new File Manager and Program Manager, as well as a new help file (fmpm.hlp). But it doesn't delete the old help files (progman.hlp and winfile.hlp), so they become orphans—left on the disk but never used.

Handle Orphans With Care

Except for files in the orphan list, it's safe to delete any of the files on the chart before you install Windows 95. But be careful with those orphans—some of them are key Windows 3.1 system files, so delete them only after first installing Windows 95 and then following this procedure:

1. After you have used Windows 95 for at least a month or so, check each file's accessed date by typing **DIR /V filename** at Windows 95's MS-DOS prompt. Do not check using file properties from within Windows 95, because this can change

the date of the accessed file.

2. If the access date is blank (which means the file hasn't been used since you installed Windows 95), move the file to a temporary directory.

3. If your system runs fine for another month, you can safely delete the file.

Not all files listed are on every system; don't worry if some aren't on yours. And remember, the files all reside in \windows or \windows\system; don't delete files from any other directory. Finally, delete only files with these dates: 3-10-92 for Windows 3.1 files, 12-31-93 for Windows 3.11, 9-30-92 for Windows for Workgroups 3.1, or 11-1-93 for Windows for Workgroups 3.11. Any other date may mean that Windows 95 or an application has replaced the file and may be using it.

By Richard Freedman

Richard Freedman, a former group manager on the Windows 95 team at Microsoft, is now a vice president at Garden Homes Management Corporation, a real estate investment firm in Stamford, Connecticut. ■

COMING UP

Getting the Most out of Windows 95

Here are all the secret ways to make Windows 95 even better. From new concepts to installation tips, you'll find what you need to know to utilize, customize, and optimize Windows 95.

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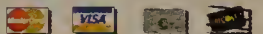
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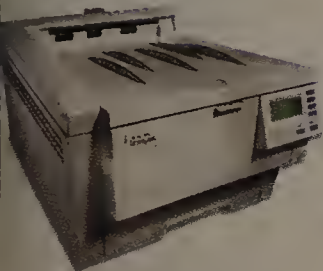
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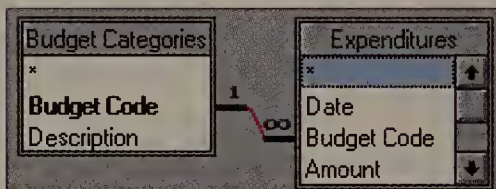
Picking Up Unlinked Records With an Access Query

Q I have some budget information stored in two related tables in an Access 2.0 database. One table, Budget Categories, holds a code and description for each type of expense I record. I enter my transactions into the other table, Expenditures. These tables are linked with a field called Budget Code.

How can I create a report that lists all expenditures and all budget categories, including categories for which there are no expenditures? I tried creating a report based on a query that links the two tables, but the result shows only categories where I've spent money.

*Kathryn Jackson,
Burlingame, California*


A You need to change your query's Join Properties. Open your query in Design mode, and right-click the section of the line connecting both tables' Budget Code fields that's marked in red here (it'll be black on your screen).



If the resulting pop-up menu doesn't have a Join Properties option, you clicked in the wrong place.

When you get the right menu, select *Join Properties*. In the resulting dialog box, select *2: Include ALL records from 'Budget Categories' and only those records from 'Expenditures' where the joined fields are equal*. Click *OK*, close the query window, and click *Yes* to save your changes. Your report will now show the empty categories.

Finding 'Start of Field' Values With Access

Q I often use Access 2.0's Find button to locate data quickly, but I  have one problem with it. By default, it finds only records in which

the entire field matches the text I've entered. I almost always change the 'Where' setting to 'Start of Field'—where Access finds any records that *start* with my text—before I begin my search. Can I make this the default?


Eric G. Lemmon, America Online

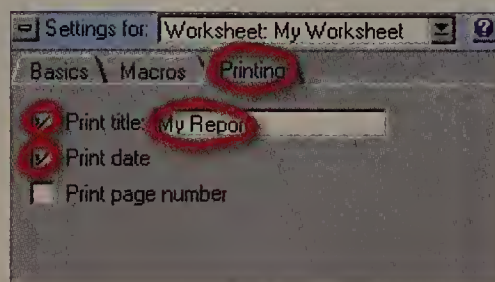
A Sorry; you can't change Find's defaults. But you can get the same result almost as easily with the * wild card. For example, if you want to find the value 'Star Gazers' without typing the whole thing, type **Star***. Access will look for records in which the value in the field you are searching starts with 'Star', even though you didn't change 'Where' to 'Start of Field'.


Printing an Approach Worksheet With a Title

Q I've spent a lot of time creating an Approach 3.0 worksheet with several calculated columns. I need to print the worksheet with a title and the date, but I don't see a way to add these to a worksheet. Do I have to create a report with the same calculations?

John Reed, Phoenix

A There is a way to add a title and the date to a worksheet. Click the *Change the style & properties* button. In the resulting dialog box,  where *Title* is the name of your worksheet. Click the *Printing* tab. Check the *Print title* and *Print date* options, and enter your desired title.



To see how the printed worksheet will look, click *Preview*. The  title will be at the top of each


page; the date at the bottom. Unfortunately, you can't change these settings.

Sorting a Keyed Paradox Table

Q I have a Paradox 5.0 for Windows file that's keyed by two fields—Last Name and First Name—so that Paradox automatically sorts the records by these fields. Sometimes I need to view the records by city, but since the table is keyed, the *Table•Sort* command will only sort it to a new table. I need to work with my original set of records.

Alicia Kaye, Washington, D.C.

A To view a keyed Paradox table by fields other than the key fields, you first need to set up a secondary index. In the Project Viewer, right-click your table and select *Restructure*. In the Restructure dialog box, change *Table Properties* to *Secondary Indexes* and click *Define*. Under *Fields*, double-click *City*, click *OK*, and when Paradox asks you for a name, enter something like **By City**. Then click *Save* back in the Restructure dialog box.

Once you've set up the secondary index, you can easily use it whenever you need to re-sort your table temporarily by city. While viewing  your table, click *Filter*, and for *Order By*, select *By City* (or whatever you called your index). Then click *OK* to view your records in the new order.

To change the viewing order back to the default, click *Filter* again and select the table's primary index. Also, the next time you open the table, it will be sorted by the key fields again.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World and the author of The Paradox 5.0 for Windows Handbook (Random House Electronic Publishing, 1994, 800/793-2665). Data Management welcomes your questions and pays \$50 for published items. See page 12 for contact information.

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Circle 47 on reader service card

PUBLISHING & PRESENTATIONS Q & A

The Harvard-PageMaker Shuttle

Q I'd like to use some color bar charts I created in Harvard Graphics in a black-and-white PageMaker document. The problem is, the charts are hard to read when printed because they come out in a few shades of gray. Can you help?

*K. K. Rama Krishnan,
Coimbatore, India*

A Swapping files between applications is sometimes necessary and almost always quite tricky. The Harvard-to-PageMaker journey is no exception. In this case, the trick is to use a monochrome color palette with your Harvard presentation before you export the charts. Here's how to do it:

1. Open your Harvard presentation in Slide Editor view and select *Style • Edit master template*.
2. Choose *Style • Color palette • Select* to open the Select Color Palette dialog box. Make sure that you are in the Styles directory, then scroll down the Filename list, select *monow.pl*, and click *OK*.
3. Click the *Back to slide* button (located at the bottom of the screen) and click *Yes* when Harvard asks whether you want to keep your changes.

4. Back in Slide Editor view, go to the slide that contains the first chart you want to export. Select *File • Export* to open the Export dialog box. Select *Computer Graphics Metafile (*.cgm)* as the File type, and give it a file name. Click *OK*, and Harvard exports the file.

5. Repeat the previous step for each chart you want to export. When finished, select *File • Save as* and save this monochrome version of your Harvard presentation under a new name, to keep the original color version intact.

You can open your PageMaker document and select *File • Place* to import the Harvard .cgm files in the usual manner. But from now on, the different shades of gray should be much easier to read when you print your bar charts in black and white.

Adding Video Licks to PowerPoint Screen Shows

Q I inserted a Video for Windows clip (in .avi file format) in a PowerPoint 4.0 slide and placed it on top of a clip art drawing of a TV screen, so it looks like the video sequence is playing on a small TV. Unfortunately, the name of the .avi file and a scroll bar display in the frame where I'm running the clip, ruining the effect. What's the magic

word that will make them disappear?

Dennis Rials, Dallas

A There's no magic word, but you can make those extraneous elements go away by changing some of the playback options in the Windows Media Player.

It's fairly simple to use media clips—including video, animation, and sound files—in a PowerPoint presentation: In Slide Editor, select *Insert • Object*.

Under Object Type, select *Media Clip* and click *OK*. This launches Media Player. Choose *File • Open* to load a media clip, then use other features—such as the VCR-style control bar—to play it. Select *File • Update filename.ppt* and *File • Exit filename.ppt & Return* to exit Media Player and embed the media clip in your PowerPoint slide.

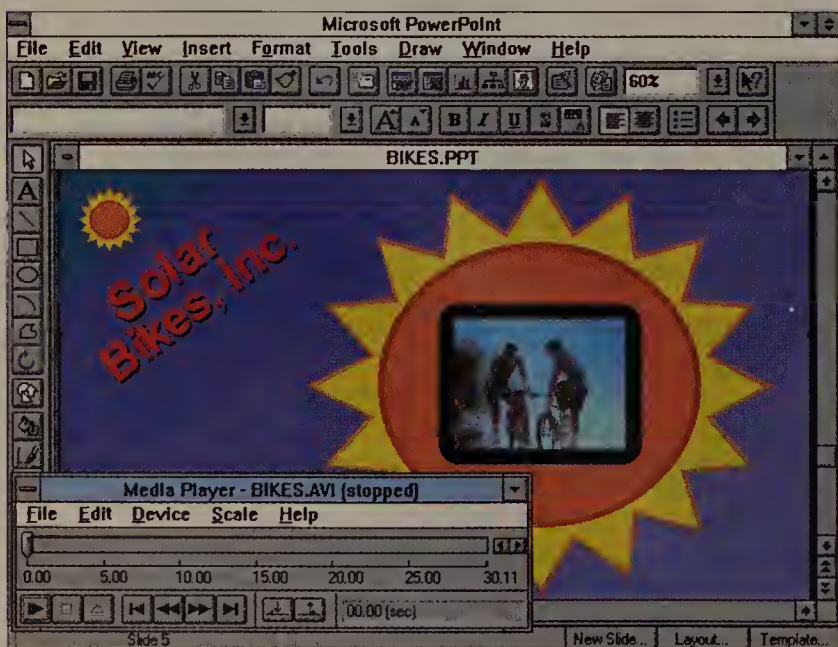
To get rid of that persistent scroll bar and file name and let your embedded video clip blend more smoothly with other slide contents, follow these steps:

1. Click the video clip object to select it (typically, this object is the first shot of the video, with a border and file name attached). Select *Edit • Media Clip Object • Edit* to launch Media Player and open the embedded clip.
2. In Media Player, select *Edit • Options*. In the OLE Object section, mark the check box for *Play in client document* and unmark the boxes for *Caption*, *Border around object*, and *Control Bar on playback*. Click *OK*.
3. Select *Device • Configure* to open the Video Playback Options dialog box. Be sure to select *Window* as the Video Mode, and unmark the box for *Zoom by 2*. Click *OK* to exit.
4. Select *File • Update filename.ppt* and *File • Exit filename.ppt & Return* to return to PowerPoint.

Now it's time to see how it looks. Select the *Slide Show* icon (at the bottom of the screen) to preview the results. With the playback changes you've just made, the video clip should now blend in seamlessly with the surrounding drawing.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Berkeley, California. Publishing and Presentations welcomes your questions and makeover candidates. PC World pays \$50 for published questions and \$200 for redesigned items. See page 12 for contact information.



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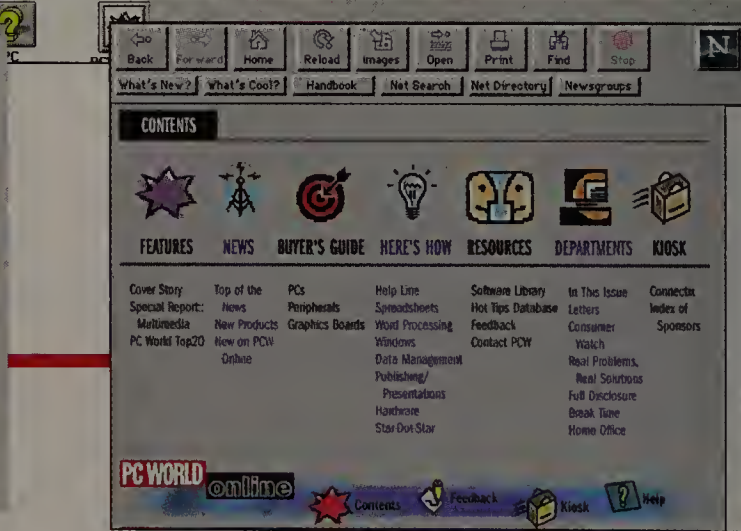
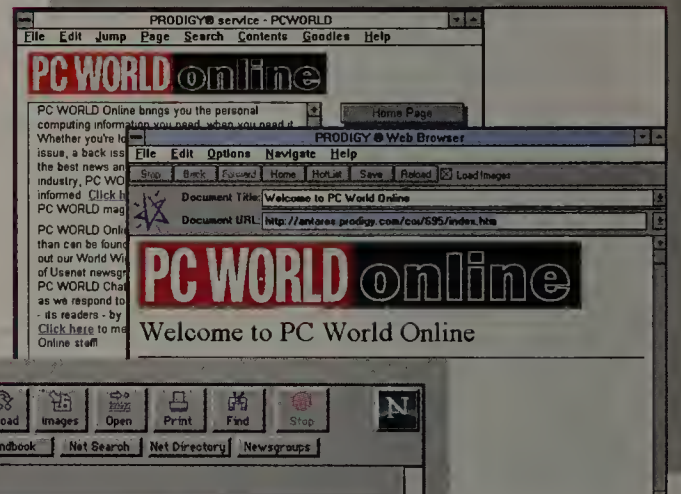
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ONLINE Q & A

Moonlighting by Modem

Q I've got a computer and a modem and want to use them to generate a little extra income. I have two questions: Can you think of creative ways I can use my PC and modem to earn extra money at home? And do you know of any good online forums or databases where I can look for employment opportunities?

Nasreen Rahman, Madison, Wisconsin

A Janet Attard, author of *The Home Office and Small Business Answer Book* (Henry Holt, 1993) and sysop of the Home Office and Small Business Roundtable on GEnie, can answer your first question:

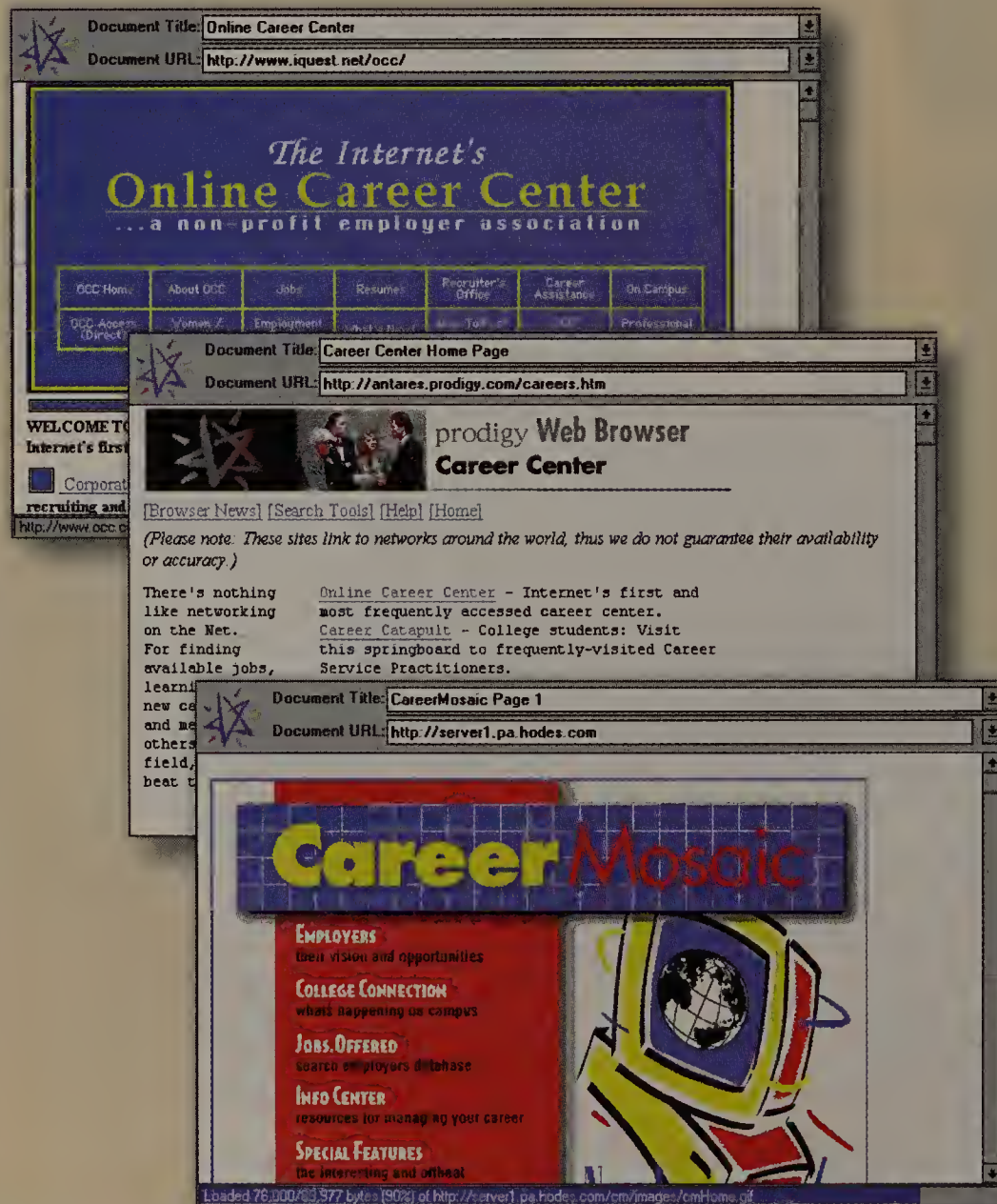
"Look for companies that generate a lot of paperwork but aren't likely to have it done in-house—book publishers, typesetters, printers," she says.

"Call the company and find out who's

in charge of typing services. Call that person, ask how they handle work overloads, and offer your services." Attard also suggests telling family, friends, and community groups that you're looking for work. Ask other departments at your day job if they need freelance help. For more advice on running a home business, check out Janet Attard's GEnie forum.

As for online employment resources, I'm afraid they're pretty skimpy. The three World Wide Web sites shown at left are worth a look. You should also check out the professional conferences on the online services, especially CompuServe. Finally, ask your local PC user group about business-oriented bulletin boards in your community. The key in all of this is to look for *contacts*—not specific jobs.

Job-Related Information on the Net



Cruising Speeds on the Net

Q Do I really need a 14.4-kbps modem to use the Internet? Is there any way I can get around this alleged minimum and dial in at a slower speed? Why or why not?

Melvin E. Dease,

Charlotte, North Carolina

A A 2400-bps modem will suffice for text-based stuff like electronic mail, mailing lists, and newsgroups. But you'll need a high-speed modem when you start rambling the World Wide Web. For comfortable cruising, I recommend 14.4 kbps as a minimum, 28.8 kbps if you can afford it (and your Internet service provider supports it).

By Judy Heim

Judy Heim is a contributing editor for PC World and author of I Lost My Baby, My Pickup and My Guitar on the Information Highway (No Starch Press, 1995, 800/420-7240). Online welcomes your questions and pays \$50 for published items. See page 12 for contact information.

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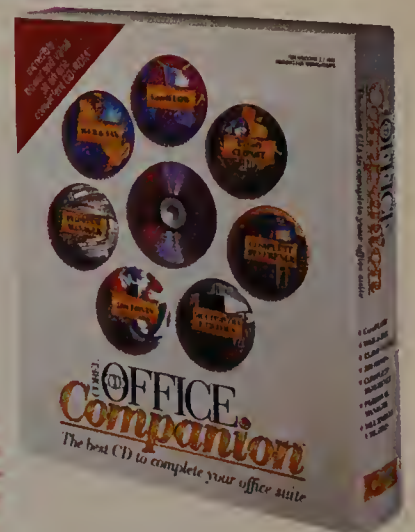
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HARDWARE Q & A

Parity Problems

Q My uncle replaced my 386 motherboard with a 486SX-25. Now whenever we run a program, we get a parity error message, and the system freezes. We replaced all four 1MB SIMMs, but it didn't help. What should we do?

*Matthew Daniels,
Peabody, Massachusetts*

A You might have to replace those SIMMs again, since you may have purchased the wrong type. Most 486SX-25 systems take 80-nanosecond (ns) SIMMs, while most 386 systems use 100ns or 120ns SIMMs. If you bought new SIMMs identical to those in the old 386, that would account for the problem: Your memory is too slow to catch up with the current processor, and parity errors are the result.

If you have the right type of SIMMs, I suggest carefully removing them and taking a rubber eraser to their gold-edge connectors. Sometimes the contacts oxidize a little, and removing the oxidation with an eraser restores the proper contact between SIMM and socket. Make sure, of course, to leave no eraser shavings on the SIMMs. See **FIGURE 1** for insertion instructions.

It's also possible that you damaged a

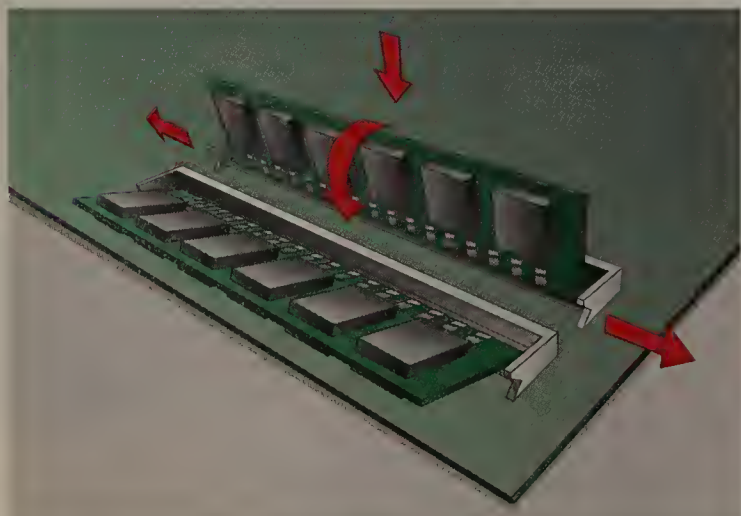


FIGURE 1: TO INSTALL A SIMM in most systems, insert it vertically in the next available socket, gently spread the socket's side brackets, and tilt the SIMM until it snaps into place. In other systems, first insert the SIMM at an angle, then tilt it upright until it snaps into place.

socket when reinstalling the SIMMs—easy to do in some systems. Replacing SIMM sockets is a difficult, expensive repair best performed by a qualified technician—and it's not worth it, considering the low price of 486 motherboards. If you broke only a plastic SIMM holder, you could try using a twist tie to hold the SIMM in contact.

Finally—and worst—your uncle may have a bad motherboard. Some poorly designed motherboards are extremely sensitive to heat, and if your old 386's casing has less ventilation than the casing in which the 486 motherboard used to live, the added heat could cause errors. The good news is that you can buy a new 486SX motherboard (without the CPU) for less than \$100.

When SCSI Won't Boot

Q My system came with an IDE hard disk. Now that I've added a SCSI drive, I'd like to reconfigure the IDE drive as drive D: and the SCSI drive as the boot drive. Is this possible?

*Seiichiro Araki,
Halifax, Nova Scotia, Canada*

A Sorry, but no dice. When you mix IDE and SCSI hard drives, an IDE hard disk *must* be the boot drive. In order to boot, a SCSI drive requires an interface card with its own BIOS. Unfortunately, even with the boot option enabled, a SCSI drive would conflict with your *master* (that is, first or only) IDE hard disk, which stubbornly insists on being the boot drive.

Running Out of IRQs

Q I recently installed a CD-ROM drive. Its interface board gave me a choice of IRQs 3, 4, 5, and 6, although only IRQ 5 was free (COM2 uses IRQ 3, COM1 has IRQ 4, and the floppy drive controller uses

IRQ 6). I want to attach a second printer to my system, but LPT2 also wants IRQ 5. Is there any way I can use the second parallel port?

Dave Marshal, Springfield, Ohio

A If you're not using COM2, you should be able to disable it using your system setup software, freeing up IRQ 3 for the CD-ROM interface board. Otherwise, you're stuck, unless you have one of the few system setup routines that let you change IRQ settings for your COM or LPT ports. Or, if your mouse is on one of your COM ports, you can get a bus mouse; it gives you a choice of IRQs (Microsoft's bus mouse lets you choose IRQ 2). The only caveat is that a bus mouse requires a free ISA expansion slot.

The Thin Black Lines

Q My new monitor has two barely visible black hairlines that divide the screen horizontally. Is this a defect I should worry about?

Pauline Robinson, Mesa Vista, Arizona

A No, it's just a structural element of a Sony Trinitron picture tube. The lines are two metal crosspieces that reinforce the monitor's fragile *aperture grille*, which separates vertical columns of color on the screen's inner surface. Other tubes use a *shadow mask* (a metal sheet with holes punched in it) to separate dots of color and don't need the crosspieces. But most people agree Trinitron tubes produce better images than any other type—and are worth those barely noticeable lines.

By Eric Knorr

Eric Knorr is a contributing editor for PC World and editor and principal author of The PC Bible (Peachpit Press, 1995, 800/283-9444). Hardware welcomes your questions and pays \$50 for published items. See page 12 for contact information.



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Power-Hungry Printer

It's a good idea to plug your laser printer into its own outlet or its own circuit. Otherwise, power surges can dim the lights or even reboot your computer.

When I first plugged in my company's new HP LaserJet 4, my computer screen went blank and the machine rebooted. I didn't think much of it at the time, but my staff later reported that the computer had rebooted itself several more times, forcing them to turn off the printer. Eventually, my uninterruptible power supply (UPS) was damaged, my surge protector blew a fuse, and my computer refused to boot.

I called Hewlett-Packard, and a representative faxed me some information about power requirements. The fax indicated that a laser printer can generate power surges ranging from 10 to 28 amperes (my particular model generates 22-amp surges). This exceeds the rated capacities of my surge protector, my UPS, and even the electrical circuit that powers my wall outlet.

I spent \$500 fixing my UPS and installing a new dedicated outlet for the printer. The bottom line: If you're buying a laser printer, check its peak power requirements—not the average power required—and don't plug it into the same outlet, surge protector, or UPS as your computer.

Thomas Paulson, America Online

Editor's note: Laser printers and copiers produce sudden power surges

when they fuse the toner onto the page. The more pages per minute the printer can crank out, the hotter the fuser has to be—and the greater the potential power surge when the fuser turns on and off.

This is why you should never plug a laser printer into a UPS. UPSs are designed to protect equipment from power surges that come from the wall outlet, not from other components plugged into them. When a laser printer's fuser lamp turns on, it strains the UPS and may even abruptly shut it down—potentially damaging your computer or the data on your hard disk. The problem can be compounded if the system is located in an older building with high-resistance wiring.

Even my puny LaserJet IIP, a now-obsolete model that prints more slowly and uses less power than the LaserJet 4, dims the lights noticeably every few minutes. To prevent it from damaging my computer or UPS, I plug the printer into its own, unfused surge protector, which in turn plugs directly into a wall outlet (not a power strip). My UPS, which powers my computer and monitor, is connected to the other socket of the same wall outlet.

If I ever trade in my LaserJet IIP for something bigger and faster, I will probably beef up the existing wiring or install a new circuit. If you do either, ask your electrician to install a 20-amp circuit breaker and extra-heavy wiring (10-gauge wire instead of the usual 12 or 14 gauge) between the outlet and the breaker panel. This reduces the resistance of the circuit and limits the voltage changes caused by sudden increases and decreases in power consumption. Besides protecting your equipment, these precautions also keep your printer from dimming the lights.

Helping Help Some More

In "Helping Help" (*Star-Dot-Star*, October 1994), Divya Mahajan explained how you can change the colors that Windows Help uses to mark pop-ups and hypertext links. But Mahajan missed how easy it is to find the colors you want.

As Mahajan said, you set Help's colors in your win.ini file. First, make a backup copy of that file for safety's sake. Then launch the file in Notepad from either Program Manager or File Manager: Select *File • Run*, type *win.ini*, and press <Enter>. Once in the file, find the section that starts with the heading **[Windows Help]**.

You can define the color for each type of link (jumps to different pages, pop-ups, and so on) by adding a line below the '[Windows Help]' line. For example, to change the color used for jump words to magenta (a red-blue combination with no green), insert the line **JumpColor=255 0 255**. Each number represents a different primary color—in the order red, green, and blue—with 0 signifying that you want none of that color and 255 that you want it full force. [See **FIGURE 1** for a list of win.ini commands that control Help's colors.]

Mahajan didn't mention Help's default settings, which it uses if you don't give it other instructions via win.ini. JumpColor defaults to 0, 128, 0, producing the pale green we're all familiar with. The other settings all default to whatever JumpColor is set to. Therefore, to change all the colors at once to a single preference, you need only add a JumpColor setting.

There's also an easy way that you can experiment with colors without setting them: First, launch Control Panel from Program Manager's Main program group. In Control Panel, double-click the *Color* icon. In the Color dialog box, click *Color Palette*, then click *Define Custom Colors*. This sequence brings up the Custom Color

Win.ini line	Defines
JumpColor= R G B	Color of jump text
PopupColor= R G B	Color of pop-up text
MacroColor= R G B	Color of macro text
IFJumpColor= R G B	Color of interfile jump text
IFPopupColor= R G B	Color of interfile pop-up text

FIGURE 1: CONTROL WINDOWS' HELP COLORS with these settings, all of which go into win.ini's [Windows Help] section. R G B stands for number values for red, green, and blue.



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Selector [see **FIGURE 2**]. As you change the red, green, and blue values on the right, you can see a sample of the color they create on the left. If you prefer, you can select a color by dragging the crosshairs around the large square and adjusting the brightness with the slider on the right. When the box in the lower left has the colors you want, launch win.ini and enter them.

Steve Hecht, Chicago

Editor's note: These simple settings can make Help much easier to read, and therefore more helpful. This is especially true if you have a monochrome notebook. And if you want to distinguish between intrafile and interfile jumps (so you'll know when you're looking at a different file), the only way to do so is through win.ini.

There's an even easier way to change these settings, thanks to a \$12.50 shareware program called More Control, from Sloop Software. It inserts itself into Control Panel and gives you a dialog box interface for changing various win.ini settings, including Help colors. You will find More Control as **morecn.zip** on PC World Online.

Unfortunately, these color settings don't work in all modes of all graphics cards, especially if you're viewing more than 256 simultaneous colors. When I set my Hercules Dynamite card, based

on the ET4000/W32 chip, to 16-bits-per-pixel mode, all the "hot" text areas—including pop-ups, jumps, and macros—defaulted to black, underlined text (the settings work in 24-color and 256-color modes). But on most systems and most graphics cards, the win.ini keywords work as advertised.

• **More Control** \$12.50; Sloop Software; 719/260-0433, 719/599-7991 (fax), 72540,144 (CompuServe)

Reader service no. 615

Where It's @

There's no need to put the usual '@echo off' command at the beginning of a short batch file. You can achieve the same effect—keeping the commands from echoing to the screen—by starting each line with an @ sign, as in **@format a: /q**.

Sarah Gonzales, Dallas

Editor's note: This is a good, quick way to keep commands from echoing, although a single **@echo off** command is easier if the file has more than three or four lines. Besides saving typing, starting each line with @ makes your batch files execute faster, since '@echo off' takes some time to process.

Robust Redirection

Using the > and >> symbols to redirect DOS output to a file is a common trick,

but unfortunately, it is also a limited one. For instance, the command **copy *.doc a: > copy.log** not only copies the desired files, it also redirects the copy command's message ('1 file(s) copied') to a new file called copy.log, preserving a record of the copy and reducing on-screen clutter. If a file called copy.log already exists, > overwrites it, but >> appends the new output to it.

But what if the current directory has no .doc files? Then the copy command gives you an error message, and DOS has no way of redirecting or hiding such messages. Luckily, NDOS, the enhanced command processor that comes with Norton Utilities, does. In NDOS, **>&>** redirects error messages to a new file, while **>>&** appends them to an existing one. If you want DOS's standard output and error messages to go to the same file, use **>&** for a new file and **>>&** to append. For instance, the command **copy *.doc a: >>@ c:\copy.log** produces no on-screen messages and logs each time it's used.

Sam Werael, Milton Keynes, Kensington, United Kingdom

Editor's note: Most Norton Utilities users don't use NDOS, but this tip still works on their machines. You can load NDOS and the batch file temporarily with **NDOS /C batname**, where **batname** is the name of your batch file. To automate this process, put that command in another batch file, or in the Command Line property of a Windows Program Manager Program Item.

If you don't have Norton Utilities, you can get yourself a copy of JP Software's 4DOS, a \$49 shareware program that Norton licenses to sell as NDOS. You'll find 4DOS as two files, **4dos5a.zip** and **4dos5b.zip**, on PC World Online.

If you use OS/2 Warp, you can redirect error messages with the operators **2>** and **2>>**. To redirect standard output and error messages to the same file, add **2>&1** to the end of the command line, as in **copy *.doc a: > copy.log 2>&1**.

• **4DOS** \$49; JP Software; 800/368-8777, 617/646-3975, 617/646-0904 (fax)

Reader service no. 616

By Brett Glass

PC WORLD online The files mentioned in this article are available via PC World Online on America Online and CompuServe. Brett Glass is a contributing editor for PC World. Star-Dot-Star welcomes your tips, macros, batch files, and short programs and pays \$50 to \$200 for published items. See page 12 for contact information.

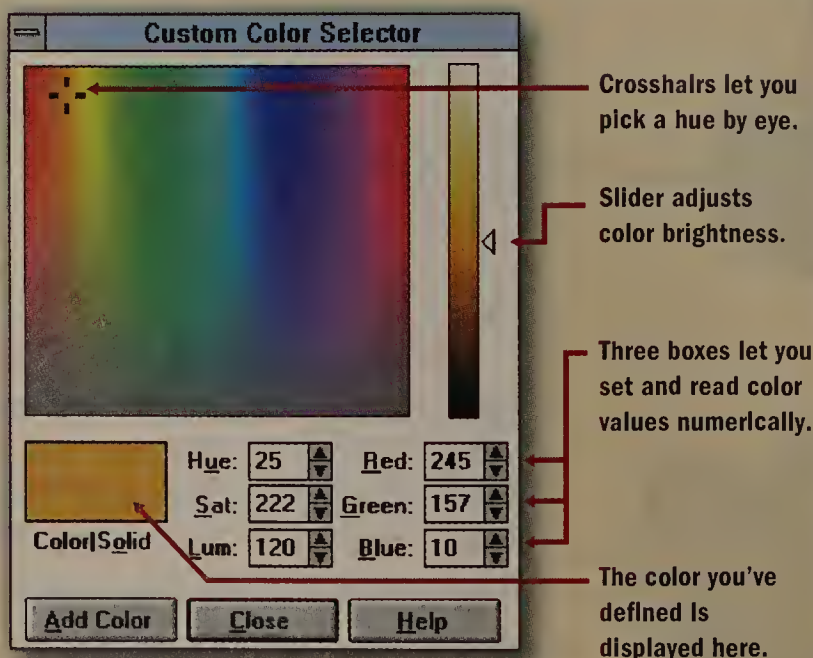


FIGURE 2: FIND THE COLOR YOU WANT with this handy selector, which is hidden several layers inside Control Panel.

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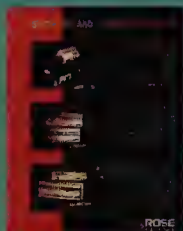
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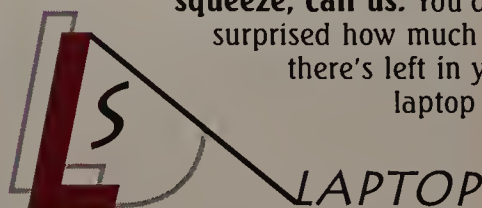
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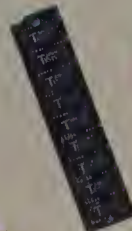
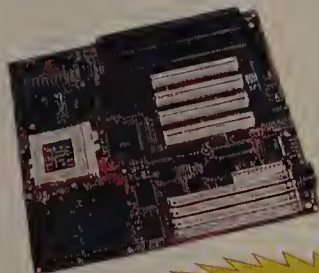
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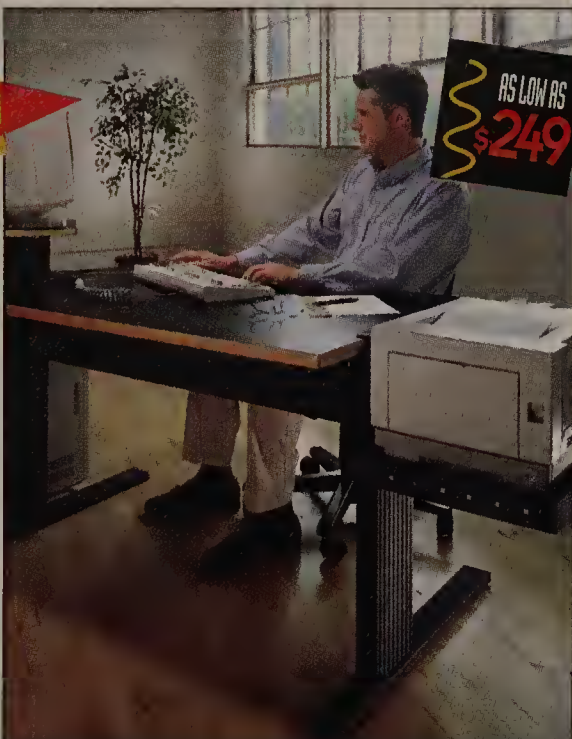
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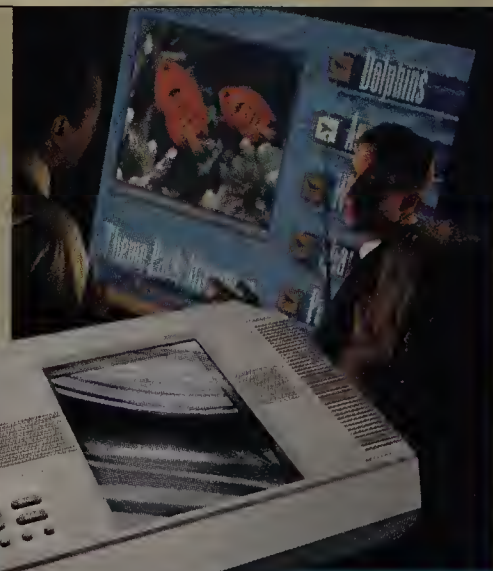
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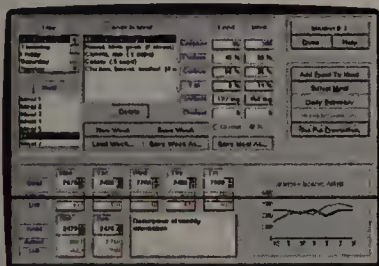
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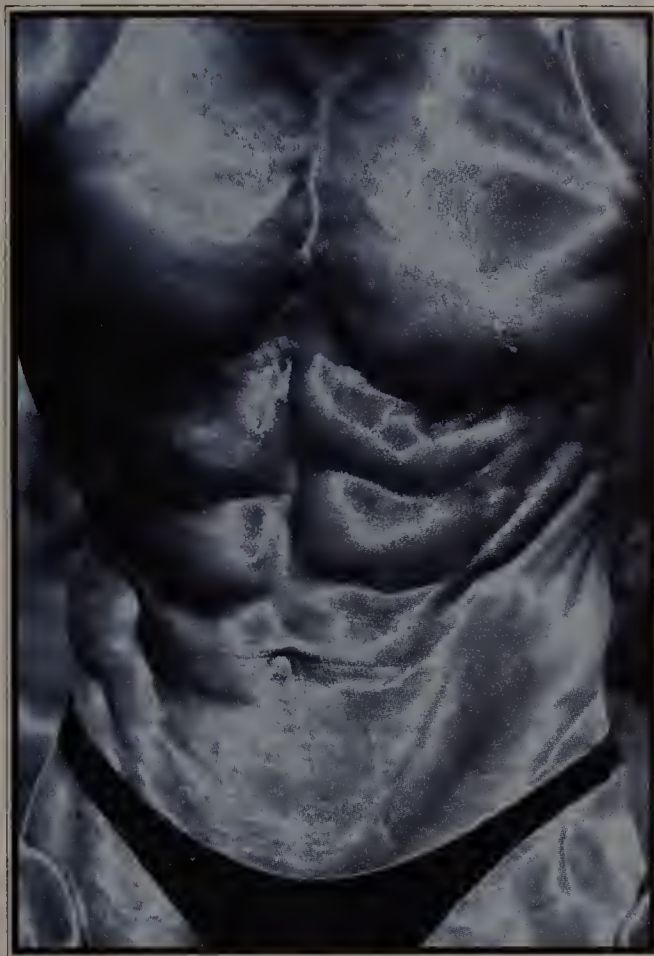
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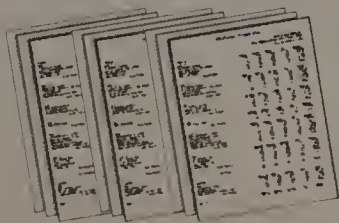
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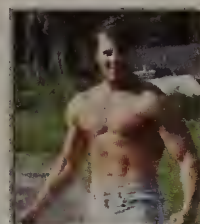
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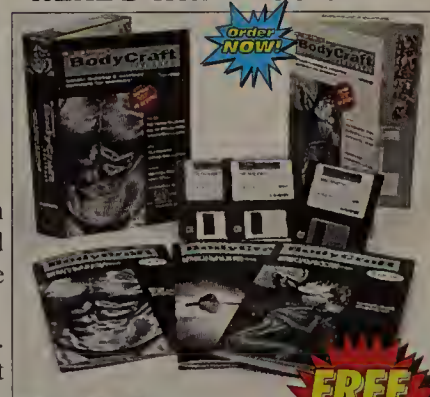
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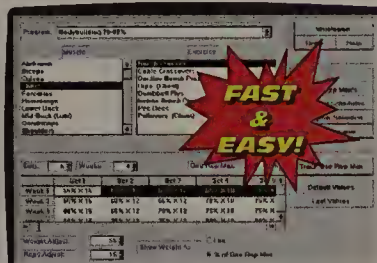
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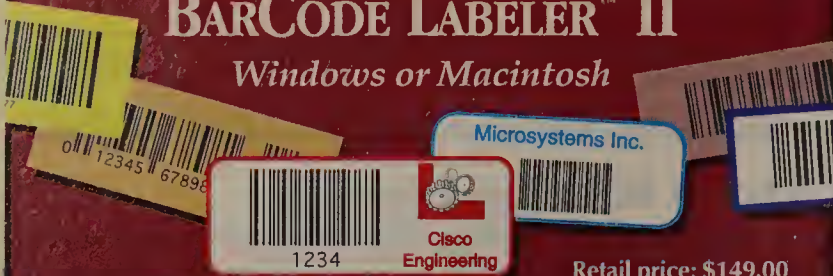
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CIRCLE 480 ON READER SERVICE CARD

FACT: The majority of **PC WORLD** subscribers do not read any other major PC publication on a regular basis (3 out of 4 issues).

73% do not read PC Magazine

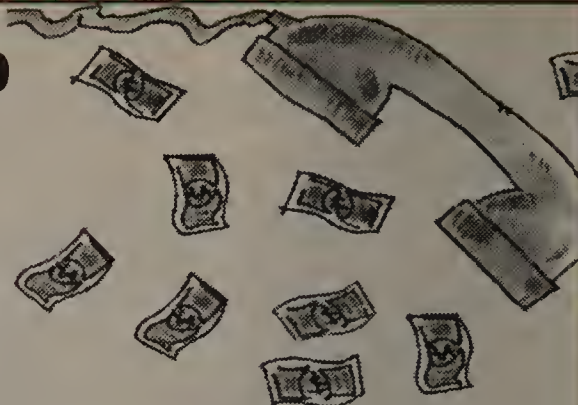
79% do not read PC Computing

90% do not read Byte

61% do not read any of the above

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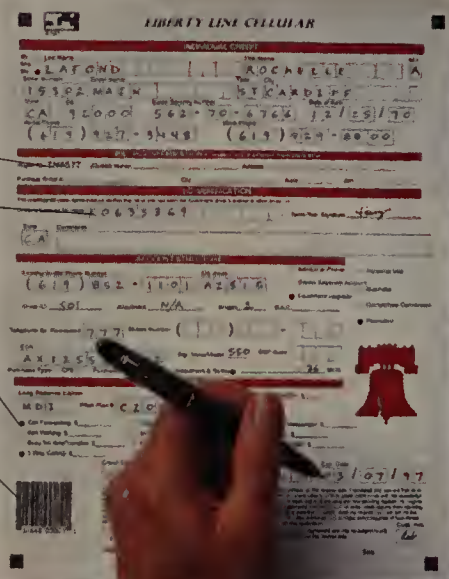


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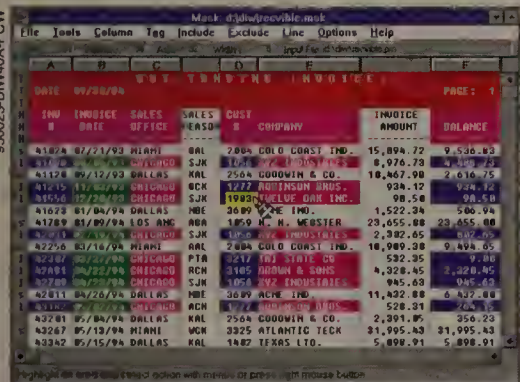
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CIRCLE 444 ON READER SERVICE CARD

PC WORLD'S PC-proficient managers are involved throughout the purchase process.

- 81% determine the need for products & their features
- 85% suggest, evaluate or recommend specific brand models
- 55% make the final buying decision

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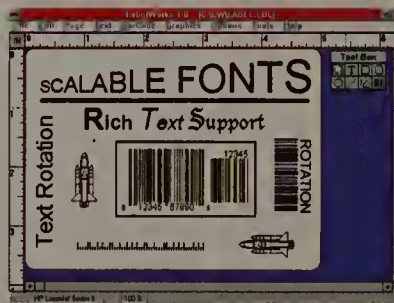
PC WORLD'S PC-proficient managers are involved throughout the buying process. They have the budget authority to sign off on final purchases and the knowledge necessary to recommend and evaluate brands.

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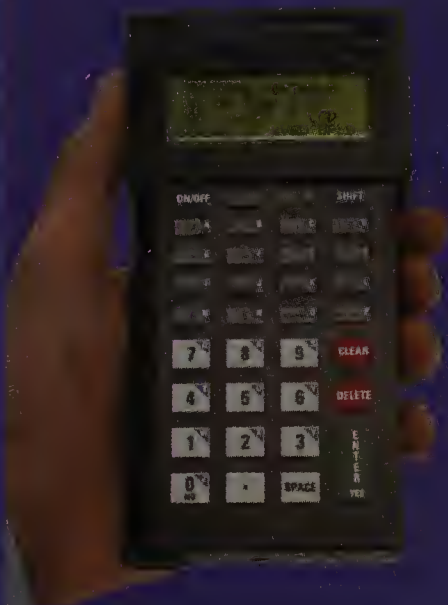
CIRCLE 432 ON READER SERVICE CARD

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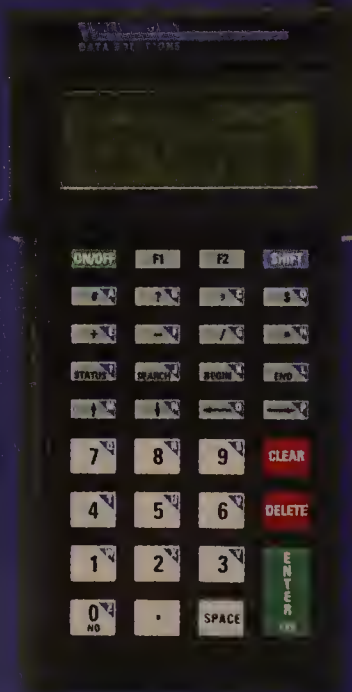
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FACT: PC WORLD delivers the managers crucial to your marketing success. 84% of **PC WORLD'S** employed subscribers are managers—the key people your advertising must reach in today's highly competitive marketing environment.

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Mr. Boddy has been murdered, and his killer remains at large. But sometime today before the scheduled 8:00 p.m. reading of Mr. Boddy's last will and testament, the murderer will change the document to read in his or her favor.

Unfortunately Boddy's closest living relative, Mr. Green, is out of town on business and was not informed of his cousin's death. But those who have gathered at the Boddy mansion for the reading include Mrs. Peacock, his eccentric sister-in-law; Colonel Mustard, an old army buddy; Professor Plum, a dear friend and classmate during his days at Yale; Miss Scarlet, a "special friend"; and Mrs. White, his loyal servant of 25 years.

Please help us find the killer by determining who changed the will... where... and with what...

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7:45 p.m. and tensions are high. The anticipated reading of the will is only minutes away. But with so many unique personalities in one room... MidWest Micro's SoundBook II should feel right at home!

When the main course is murder, people tend to lose their appetite—but they still hunger for convenience. And that's where the *NEW* SoundBook II comes in. Featuring a programmable Personal TouchPad, two RAM compartments and a modular design, this MidWest Micro Notebook is dressed to kill. So before we interrogate the other suspects at the table, let's investigate the SoundBook II...

Powerful Features... Weak Alibi

Who *knows* where this portable was on the night in question? Weighing only 6 lbs., it could have gone *anywhere*! Some eyewitnesses claim they saw the SoundBook II with a built-in floppy drive at 6:37 p.m. While another source swears the same drive bay was carrying an AC adapter at precisely 6:40! What makes the SoundBook II such a master of disguise?—It uses special compact peripherals, A.K.A. Personality Modules, that fit its modular 3.5" drive bay. Enjoy the floppy drive and AC adapter modules that come with your SoundBook II. And feel free to order additional modules like a 3.5" CD-ROM drive, a 14.4 Kbps voicemail fax modem, an extra hard drive and an extra battery.

Evidence Stacked In Your Favor

If *speed* is your motive, you may want to check out MidWest Micro's Pentium® Processor Based SoundBook Plus. Like the SoundBook II, it comes with 16-bit stereo audio and built-in speakers. But this SoundBook *also* features a 75 MHz or 90 MHz Intel® Pentium Processor. And if you think *that* sounds like a setup, get a load of The Real Warranty. It covers all MidWest Micro Notebooks for a full three year sentence—parts *and* hard labor included! We can only assume that Mr. Boddy (being of sound mind) would have loved both MidWest Micro SoundBooks.

Contributing To The Delinquency Of A Diner?

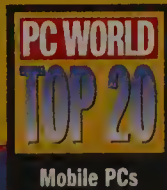
Although it's unlikely that these MidWest Micro Notebooks are capable of murder, they *may* be found guilty of aiding and abetting. In fact, one of these guests may have already used a SoundBook to change Mr. Boddy's will... Perhaps Mrs. Peacock is doing it *right now*!—Or maybe she's just playing a little Microsoft® Golf.

Since we have a little time before Mr. Boddy's lawyer arrives, let's reconstruct another way this heinous crime may have been committed...

"Fastest portable we've ever tested, a fine desktop replacement"
—PC World, April 1995

"MidWest Micro wowed us with its Elite Pentium SoundBook Plus, the first Pentium-90 notebook we've tested; its performance blows every other reviewed mobile out of the water."
—PC World, March 1995

"...produced the highest Winstone 95 score of all reviewed systems"
—PC Magazine, January 1995



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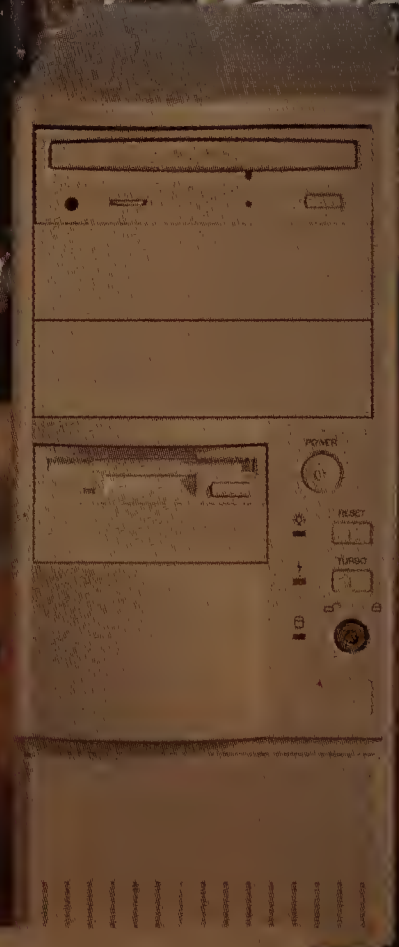
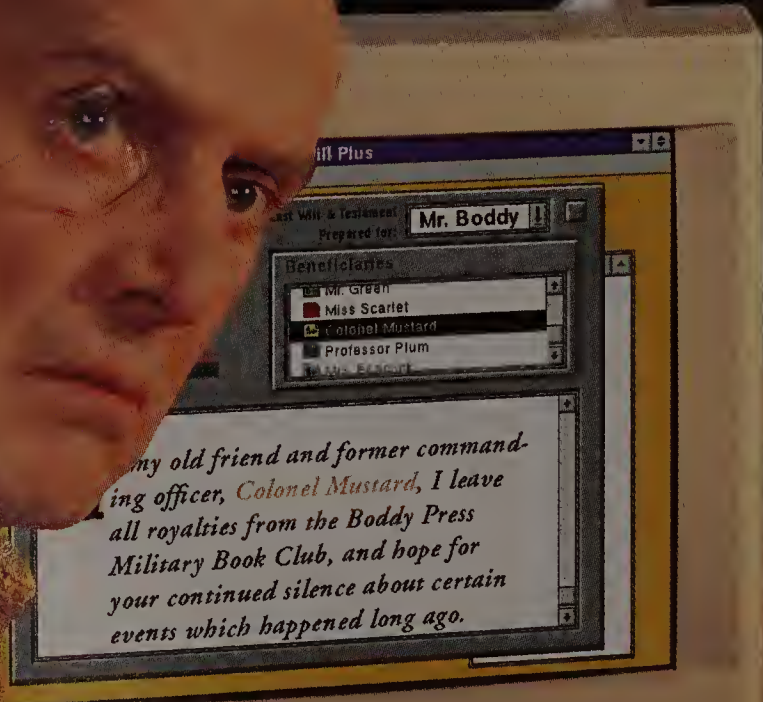
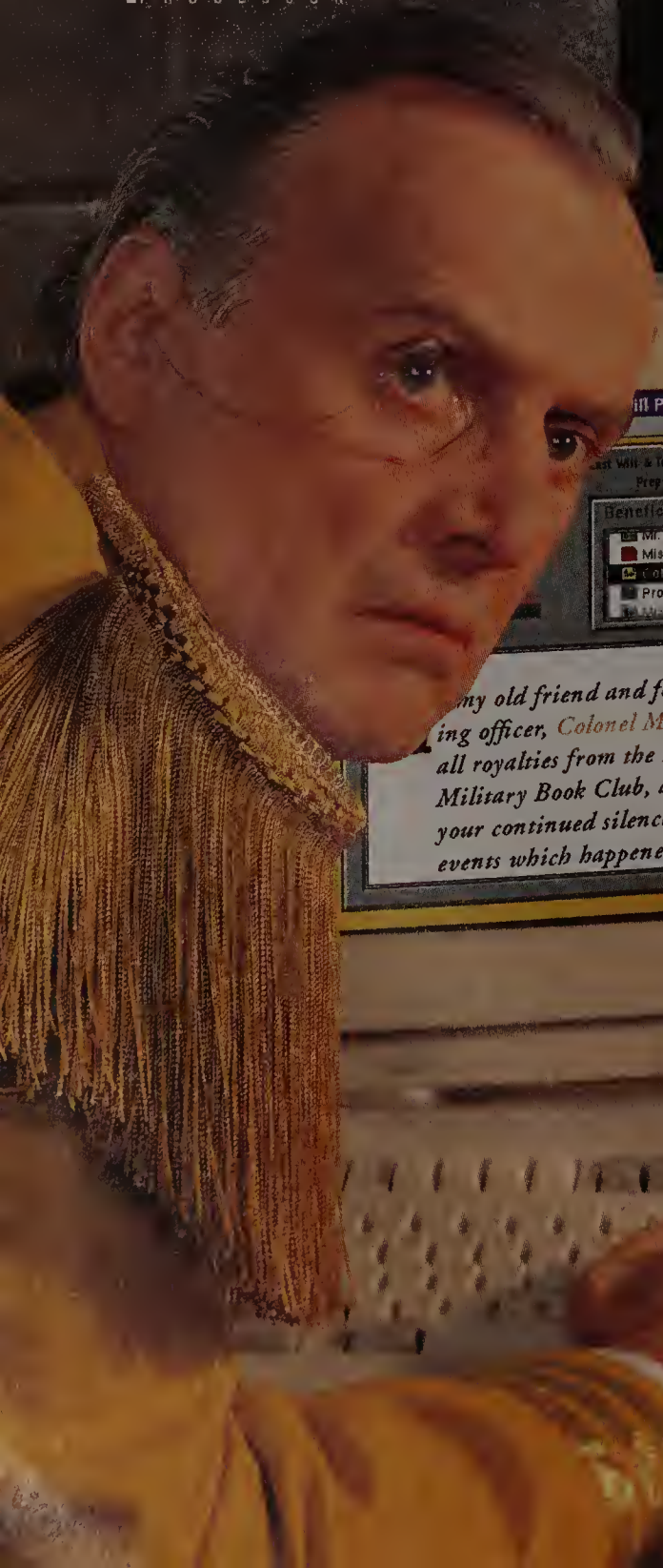
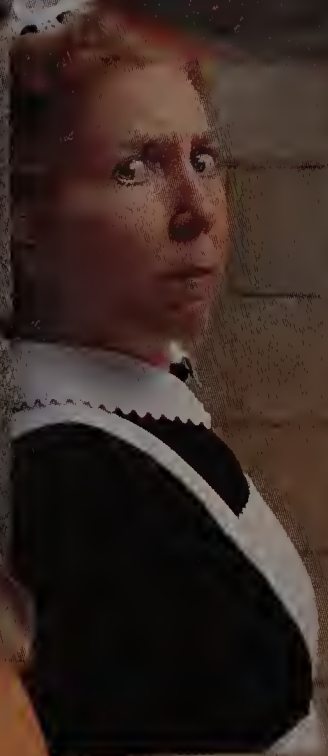
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Colonel Mustard

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TOP SECRET

In The Kitchen With A Midwest Micro PC?

"It's darn fast and darn cheap."
— PC Computing, April 1995

"The Elite P5-90 is one of the fastest computers we've tested."
— PC World, January 1995

PC WORLD
TOP 20

Power Desktops

"I can't believe these people didn't put lunch on the itinerary," the Colonel grumbled. "And you would think a person with this much money could afford better lunch meat." Was it merely hunger pains that brought Colonel Mustard into the kitchen this afternoon? Or was it Mr. Boddy's Midwest Micro Home PC... and revenge!...

Mustard hadn't touched a computer since his code cracking days in the Middle East. But this "MidWest Micro Home PC" looked nothing like *that* relic. Typing in the secret password with his one good hand, the Colonel checked his watch again. He knew exactly how long it would take the IntelDX4™ 100 Processor to find the will, make the changes and save them on the Home PC's 850 Mb hard drive. "Not bloody long at all," he said with a smirk.

Colonel Mustard had planned his strategy very carefully. And after reading six computer magazines cover-to-cover, he learned that MidWest Micro Desktop Systems are available with Intel486™ and Pentium® Processors, double- and quad-speed CD-ROM drives, voicemail fax modems and hard drive capacities up to 1.6 Gb! And whether you order a multimedia-packed Home PC or an Office PC stocked with powerful business software, you should always expect an ambush of high performance. But even nine weeks at boot camp, two wars and a Purple Heart didn't prepare the Colonel for what he was about to witness...

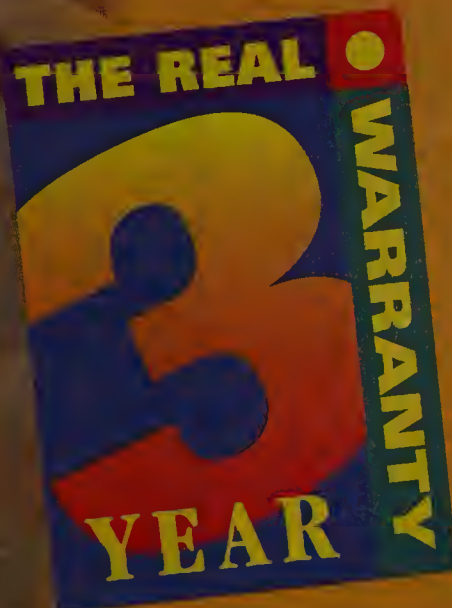
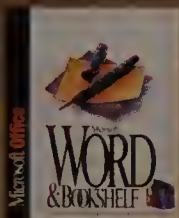
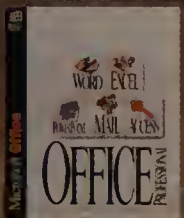
Opening the Home PC's Microsoft® Family Bundle, Mustard found an arsenal of interactive CD-ROM software—Encarta® 95, Works, Money, Scenes, Dangerous Creatures and Golf were his to conquer. Before he knew it, the 15" color screen had exploded into multimedia mutiny. And he was even *more* impressed with Microsoft Bob™. Featuring eight household management programs in one efficient package, this new recruit had all the makings of a great soldier.

By this time the Colonel was distracted from his original covert operation. So he set a course for the library to see what Mr. Boddy's 120 MHz Office PC had to offer...

Who killed Mr. Boddy and changed his will? The rest of the investigation is up to you...

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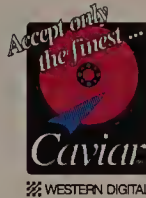
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 - ▶ 8-Bay Mini-Tower Case
 - ▶ 4 ISA, 2 PCI & 1 PCI/ISA Slots
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 - ▶ Signature 101-Key Enhanced Keyboard
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 - ▶ 3.5" Disk Drive
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 - ▶ 8-Bay Mini-Tower Case
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 - ▶ 8-Bay Mini-Tower Case
 - ▶ 4 ISA, 2 PCI & 1 PCI/ISA Slots
 - ▶ Super I/O using 16550 UART & ECP/EPP
 - ▶ Signature 101-Key Enhanced Keyboard
 - ▶ Microsoft Mouse
 - ▶ MS-DOS 6.22 and WFW 3.11
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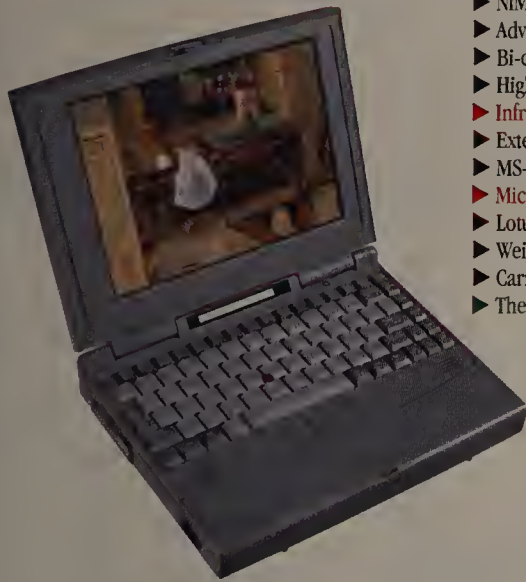
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- ▶ MS-DOS 6.22 & WFW 3.11
- ▶ Microsoft Works for Windows 3.0 & Golf
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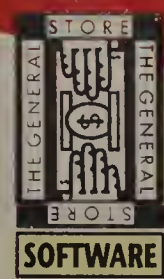
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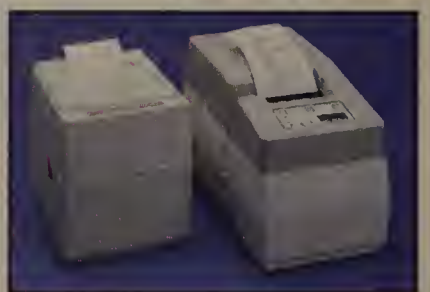
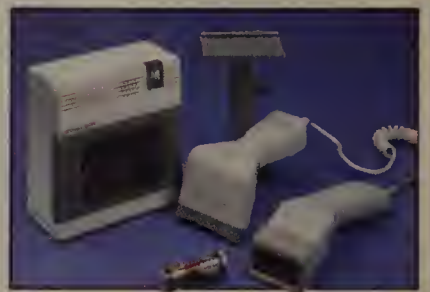
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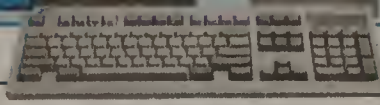
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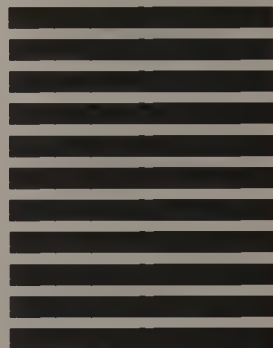
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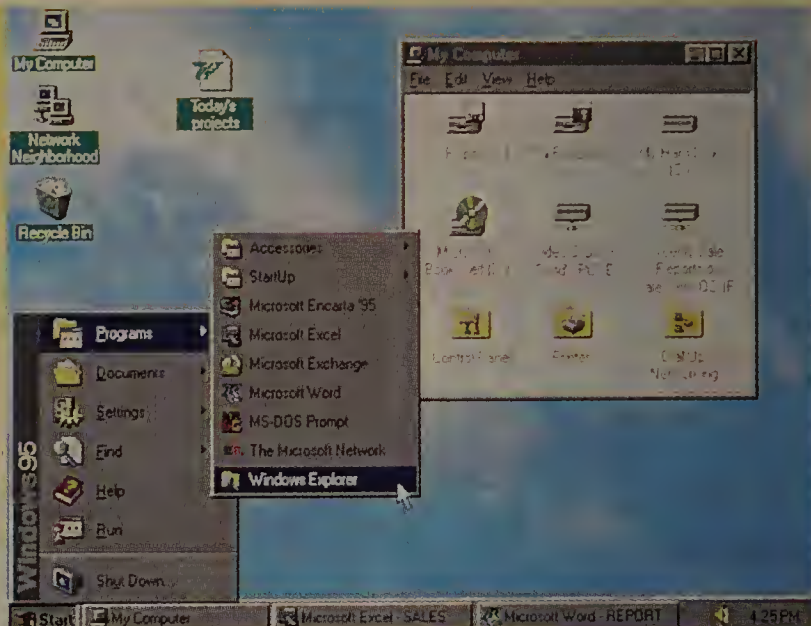
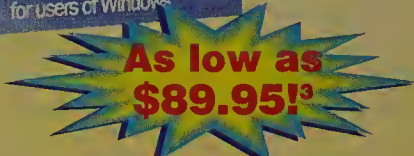


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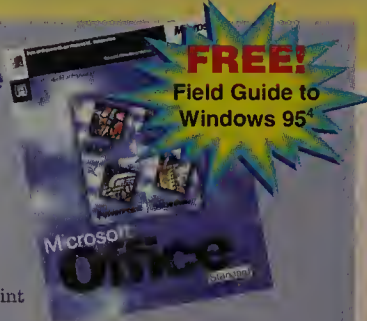
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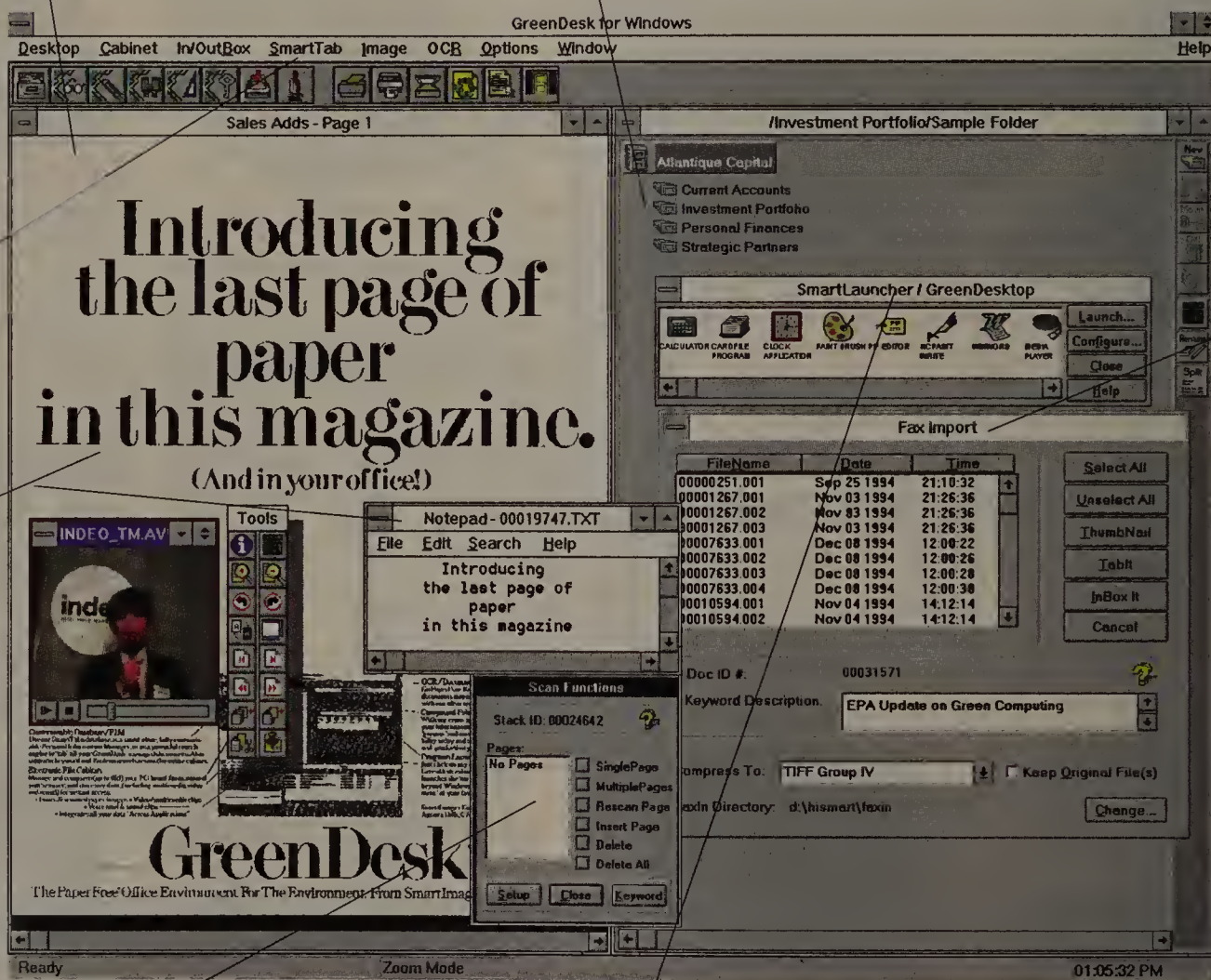
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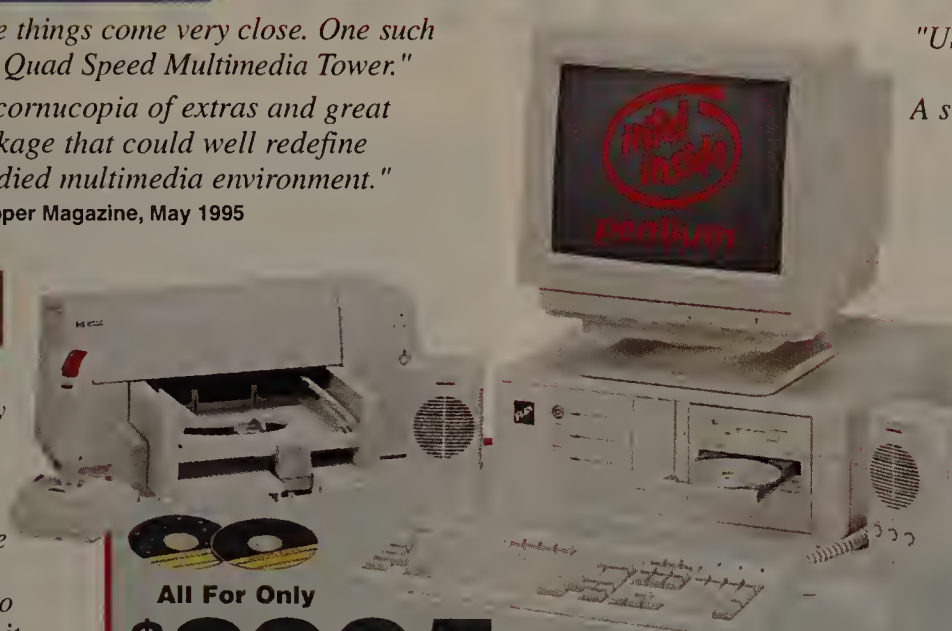


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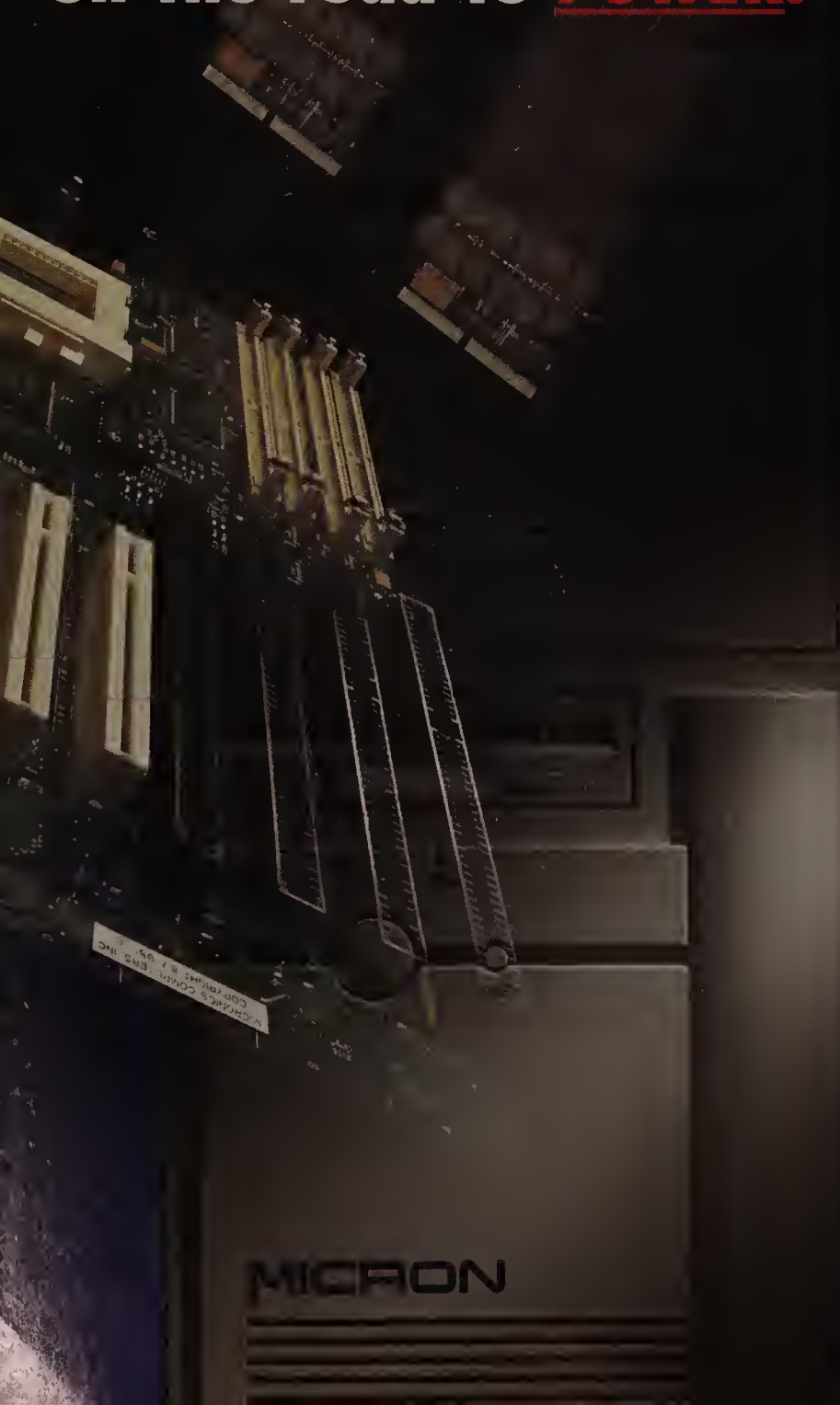
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- Allows for cost of non-inventory and special orders.
- User-defined tax sales rates.
- Produces back-order report by customer.
- Displays customer balance during invoicing.
- Allows recurring invoices.
- Allows price-level lookup during invoicing.
- Over 15 order entry reports (sales analysis, history, etc.).

PURCHASE ORDER

- Add vendors and inventory on the fly.
- Generates purchase orders from understock inventory items.
- Tracks multiple vendors for each stock item.
- Lists economical order quantity.
- Allows reprinting of purchase order.
- User-defined purchase order formats.
- Tracks promised date vs. actual date; quoted cost vs. actual cost.

PAYROLL

- Calculates taxes.
- Allows user to update federal, state and local tax tables.
- Allows for 18 pay rates per employee.
- Prints W-2's, 941 and quarterly reports.
- Submit W-2 on disk or magnetic media.
- Allows per-diem pay, contract, piece work, hourly and salary.
- Multi-company payrolls.
- Prints checks.
- Allows "after the fact" payroll.
- Allows benefits and deductions on fixed amount, unit amounts, percentage of gross or variable amount.
- Allows 22 user-defined benefits and deductions per employee.
- Allows 401, cafeteria plans.
- Supports any user-defined pay periods from 1 to 52, including daily.
- Over 22 payroll reports.

CHECK RECONCILIATION

- Single or multiple bank accounts.
- Prints user-defined checks.
- Sort by voided, stop-payment, deposit sources.
- Allows recurring transactions.
- Allows reconciliation either from checkbook or bank statement.
- Retains check register for 100 years.
- Sorts checks by number, date, payee, vendor or employees.

INVENTORY

- Minimum/maximum quality levels (reorder points).
- Lookup by number or description.
- Allows quantity decimal precision up to four places.
- Supports up to five quantity price/break price/levels on each item.
- Provides bill of materials processing (kits and manufacturing).
- Provides purchase and sell conversions.
- Prints user-defined inventory labels.
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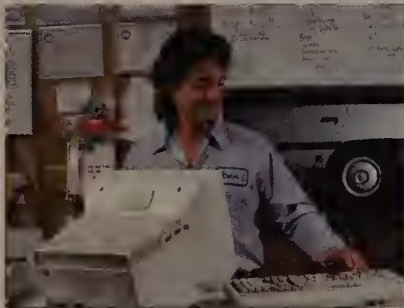
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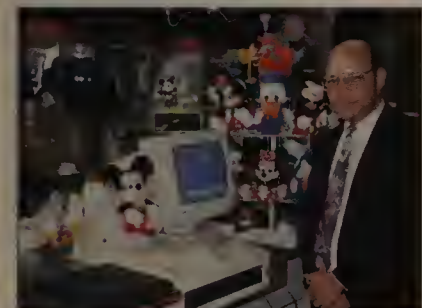
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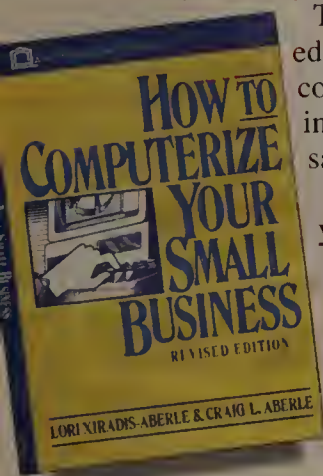
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New device turns any electrical outlet into a phone jack

Engineering breakthrough gives you unlimited phone extensions without wires or expensive installation fees



By Charles Anton

You don't have to have a teenager to appreciate having extra phone jacks. Almost everyone wishes they had more phone jacks around the house.

When I decided to put an office in my home, I called the phone company to find out how much it would cost to add extra phone jacks. Would you believe it was \$158?

No more excuses.

Today, there are a thousand reasons to get an extra phone jack and a thousand excuses not to get one. Now an engineering breakthrough allows you to add a jack anywhere you have an electrical outlet. Without the hassle. Without the expense. And without the miles of wires.

Like plugging in an appliance.

Now you can add extensions with a remarkable new device called the Wireless Phone Jack. It allows you to convert your phone signal into an FM signal and then broadcast it over your home's existing electrical wiring.

Just plug the transmitter into a phone jack and an electrical outlet. You can then insert a receiver into any outlet anywhere in your house. You'll be

able to move your phone to rooms or areas that have never had jacks before.

Clear reception at any distance. The Wireless Phone Jack uses your home's existing electrical wiring to transmit signals. This gives you sound quality that far exceeds cordless phones. It even exceeds the quality of previous devices. In fact, the Wireless Phone Jack has ten times the power of its predecessor.

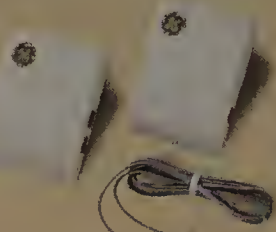
Is the Wireless Phone Jack right for you?

The Wireless Phone Jack works with any single-line phone device. Almost anyone could use it, especially if...

- **Few jacks.** *You want more phone extensions without the hassle and expense of calling the phone company.*
- **Bad location.** *You have jacks, but not where you need them most, like in the kitchen, garage, home office or outside on the deck.*
- **Renting.** *You want to add extensions, but you don't want to pay each time you move.*
- **Other phone devices.** *You have an answering machine, modem or fax machine you want to move to a more convenient place.*

The Wireless Phone Jack System

consists of a transmitter (right) and a receiver (left). One transmitter will operate an unlimited number of receivers.



Unlimited extensions—no monthly charge. Most phone lines can only handle up to five extensions with regular phone jacks. Not with the Wireless Phone Jack. All you need is one transmitter, and you can add as many receivers as you want. Six, ten, there's no limit. And with the Wireless Phone Jack, you'll never get a monthly charge for the extra receivers.

Works with any phone device.

This breakthrough technology will fulfill all of your single-line phone needs. It has a special digital interface for use with your fax machine or modem. You can even use it with your answering machine just by plugging it into the Wireless Phone Jack receiver.

Special factory-direct offer.

To introduce this new technology, we are offering a special factory-direct package. For a limited time, the transmitter is only \$49. One transmitter works an unlimited number of receivers priced at \$49 for the first one and \$39 for each additional receiver. Plus, with any Wireless Phone Jack purchase, we'll throw in a phone card with 30 minutes of long distance (a \$30 value) for only \$9.95!

Try it risk-free. The Wireless Phone Jack is backed by Comtrad's exclusive 30-day risk-free home trial. If you're not completely satisfied, return it for a full "No Questions Asked" refund. It is also backed by a one-year manufacturer's limited warranty. Most orders are processed within 72 hours and shipped UPS.

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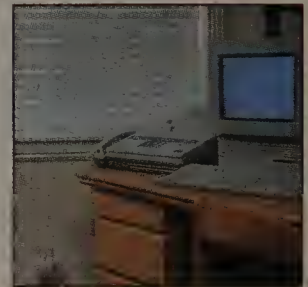
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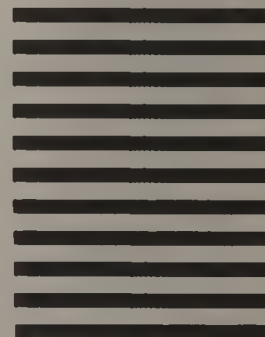
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EDITED BY CHRISTINA WOOD



Consumer Watch

Confessions of a CD-ROM Bargain Hunter

BY ROBERTA FURGER

Have you shopped for CD-ROM titles lately? I have, and believe me, it's confusing. Everyone knows they're expensive, but figuring out just how expensive is a nightmare. First, there are the prices quoted by software companies—the ones that accompany the reviews in this magazine, for example. That could be a list price or an "estimated selling price," and often neither matches what you'll actually

pay. Then there are the widely divergent prices at stores. A CD-ROM priced at \$40 in one store can sell for \$60 in another. Just shopping for titles can quickly eat up the precious free time you'd hoped to spend *playing* with your new CD.

When you have to get that talked-about game or entertainment title, wouldn't it be great to know which stores to avoid—and which to check out first? Should you go to the same stores where you buy your videos

and music, or are computer and software stores still your best bet? To find out, I went shopping. I hit the road armed with a list of 15 popular CD-ROM titles (The 7th Guest; Microsoft Bob; Compton's Multimedia Encyclopedia; Doom II; Encarta '95; Freddi Fish and the Case of the Missing Kelp Seeds; Just Grandma and Me; Kid Pix Studio; Links 386 CD; Microsoft Baseball, 1994–95 Edition; Print Shop Deluxe, CD Collection; Quicken Deluxe; The Lion King; Where in the World is Carmen Sandiego? and Myst).

I compared prices at leading software stores, computer superstores, warehouse clubs, and discount department stores. The results of my expedition surprised me: Prices were all over the map, and selection was unpredictable at many stores. I found bargains at WalMart and prices that made my hair stand on end at Software Etc.

THE TOUGH GO SHOPPING

CompUSA Easily has the best selection around. There are so many titles, in fact, that it took awhile to locate everything on my list. The sales staff was helpful when I asked for assistance, checking the computer when they couldn't find titles on the shelves. Ultimately, we found all but one, the new 1994–95 version of Microsoft Baseball. Prices were very competitive; only the warehouse clubs were cheaper.

Recommendation: If you only have time to shop at one store, make sure it's a superstore. Of the stores that I checked out, CompUSA offers the best combination of price and selection.

Egghead Software A bit pricey, but the cheapest of the software-only stores. The selection was almost as good as at CompUSA, though prices were typically higher.

Recommendation: Worth a try for hard-to-find titles—the store had everything on my list, even the two elusive sports titles.

Price Club/Costco The selection was spotty—I found Myst and Print Shop Deluxe at a local Costco, but the nearby Price Club had neither. The prices were unbeatable, though: Compton's Multimedia Encyclopedia and Freddi Fish were \$10 cheaper here than at CompUSA.

Recommendation: Definitely worth a

Feedback

You Better Shop Around

n/a = not available

	Encarta '95	Lion King	Myst	Quicken Deluxe (CD)	2000 CD Collection	SimCity
CompUSA	\$80	\$30	\$40	\$60	\$60	
Egghead Software	\$80	\$30	\$40	\$60	n/a	
Price Club/Costco	\$80	\$29	\$42	\$53	n/a	
Software Etc.	\$94	\$35	\$60	\$60	\$90	
Target	n/a	\$30	\$50	\$60	\$60	
Walden Software	n/a	\$38	\$54	\$60	\$65	
WalMart	\$95	\$30	n/a	\$55	n/a	

Beware impulse buys: Prices vary by location.

look. Next time you stop by for a five-pound bag of tortilla chips, check out the stack of CD-ROMs.

Software Etc. Lots of software, but you pay dearly for the selection. The Sim City 2000 CD collection was \$90—at least \$25 more than at any other store. Myst was \$60, compared with \$40 at CompUSA and \$42 at Price/Costco.

Recommendation: Skip it.

Lion King cost only \$1 more than at Price Club/Costco. But at \$40, Just Grandma and Me was \$8 more than at the warehouse stores, and \$5 more than at CompUSA.

Recommendation: Worth a look, but don't expect to find the kind of bargains you'll find in the video section.

Walden Software A good selection of CD-ROM titles, software, and Nintendo and Sega game cartridges. The prices were typically as high as at Software Etc., but at least the store's layout made sense: CD games were in one section, reference titles in another. I found everything I was looking for in just a few minutes.

Recommendation: Too pricey to be a real contender, but mall shoppers may want to stop by for hard-to-find titles.

WalMart Pricing is wildly inconsistent. Encarta '95 was \$95—the highest price of any of the stores I visited. The Quicken Deluxe CD was only \$55, though—just \$2 more than Price Club/Costco and CompUSA. Selection is also hit-or-miss; six of the titles on my list were nowhere to be found.

Recommendation: Risky business. Make sure you know the "estimated" selling price before you buy.

Write to us about where you shop for CD-ROM titles or about any other home computing issues. And as always, you can contact Consumer Watch with problems or questions. We'll investigate complaints and write about issues of broadest interest. See page 12 for contact information.

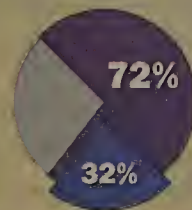
Target An okay selection (I found 8 of the 15 titles on my list), but you may need to hunt around a bit. The store I visited had a hodgepodge of CD-ROMs and software in one aisle, and a locked case over in a corner that held the newer titles. Pricing is a mixed bag: The



Lost in the Ether?

In the past few months we've received an increasing number of complaints about Somerset, New Jersey-based Quantex Microsystems. Customers report that getting through to technical support is a struggle. Wondering what was going on, we contacted Mike Polissky, vice president of direct marketing at Quantex, who said that until recently the company didn't have enough phone lines to handle the volume of calls it was getting. When all lines were busy, customers got bounced into voice mail. But when the voice mail system reached capacity, messages got lost.

TAKE NOTE: 72 percent of surveyed Internet users shop for goods through the Internet. 32 percent of that sample actually make purchases over the Internet.



Source: 1995 online survey of 2000 Internet users by O'Reilly & Associates

According to Polissky, a new phone system was installed in early May. Now, instead of going to voice mail, you wait on hold for a live technician. If the technicians can't get to your call, the receptionist takes a message. We called the sales number and were speaking to a representative after two rings. But when we called tech support, the phone rang ten times, we waited on hold for 3 minutes, and the receptionist took a message. If you're a Quantex customer, let us know what happens when you call.

The Woes of Success

A second deluge of letters, this time about EPS Technologies, also plucked our curiosity. A conversation with Jim Hanson, operations manager for the South Sioux City, South Dakota, company revealed that the good reviews they had garnered in magazines like PC World were wreaking havoc. "It's been nuts," says Hanson. "But it's really very cool." In November 1994, an EPS system landed a spot in PC World's Top 20. The result? The company

WELCOME HOME



Welcome to *PC World @Home*, dedicated to keeping you informed about computing outside the office. Here you'll recognize some old favorites—*Consumer Watch* and *Home Office*—and find some new ones: *Feedback* gives you all the scuttlebutt, gleaned from letters, online chat, or picked up on the street. In *House Calls*, how-to guru Lincoln Spector helps you make the most of your PC—and your time. In *HouseWare*, our honest reviews tell you which products to buy and which to avoid. And if you're shopping for a computer, watch for the *Home PC Scorecard*, which debuts next month. Also next month, look for *Bug Watch* in its new home in *Top of the News*.

We hope you enjoy the new @Home section. Feel free to write and tell us what you think. —Christina Wood, Editor

Cybertoys for Everyone in the House

A digital camera, videos to rent, help with relationships



Smile—you're on Apple's QuickTake 150

APPLE IN YOUR EYE

Want your dog's picture on your computer screen? No need for a scanner or crayons. Apple's QuickTake 150 is point-and-shoot in the purest sense. This 1-pound, 24-bit, filmless camera lets you capture 32 shots right to disk (if you can shoulder the hefty price tag). Just connect the serial cable to your computer and the camera, snap away, then use the included software to load the images. Minutes later you'll have a digital contact sheet; pick the shots you want—crop, edit, or delete the embarrassing ones. The color quality of your shots will rival that of Polaroid prints—though the detail won't be as sharp. Includes three AA lithium ion batteries. An optional AC adapter is \$65. —John Goddard

QuickTake 150 \$739; Apple Computer; 800/538-9696, 408/996-1010. Grade: **B**
Reader service no. 757

WHAT MOVIE TO RENT?

With a database of over 90,000 titles—everything from obscure silents to *I Love Lucy* episodes to Jane Fonda workout tapes—

the All-Movie Guide offers more ways to search for a video than any reference I've seen. You can bring up a list of R-rated science-fiction comedies made between 1970 and 1985, "excellent family films" that contain nudity and profanity, or just about any combination you can think of. You can also search by plot element, mood, artistic style, or your own preferences (deduced from information you enter). There are also video clips of celebrity interviews, and trivia games. This isn't a scholarly reference, but it's great if you're just looking for something to rent on a

Saturday night.—*Lincoln Spector*
All-Movie Guide \$69.95; Corel; 613/728-8200. Grade: **A-**
Reader service no. 758

YOUR ALIEN SPOUSE



I love the title: *Men Are From Mars, Women Are From*

Venus. And the subject matter is right up my alley: As a licensed marriage and family therapist, I spent years helping couples communicate. With this disc I got to sit back and observe couples role-play real life situations. First I checked out his view, then hers. And I learned some alternative communication styles. Throughout, John Gray, author of the book of the same name, offers snappy, right-on-the-money commentary. I see lots of CD-ROMs, but few are as thoughtfully assembled as this one. If you'd like to add luster to your communication skills—with anyone of the opposite sex—this is the ticket. —Steve Bass

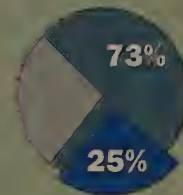
Men Are From Mars, Women Are From Venus \$49.95; Harper Collins; 800/424-6234, 212/207-7000. Grade: **A**
Reader service no. 759

tripled sales within six months. At first the sales department faltered under the sudden increase in business. And recently the technical support department has been hit. EPS, which sprang from the nearby Gateway 2000 six years ago, responded by hiring as many people as could fit into its facilities. "We are packed in here like sardines," says Hanson. When we spoke to Hanson, a new facility was under construction. But he thought the staff was handling the current load of calls.

Can't Kill Nintendo

You thought buying a multimedia computer would wean your kids off Nintendo, right? Not according to recent interviews that Cambridge, Massachusetts-based Forrester Research conducted with game developers and publishers. According to the survey, the current interest in the PC platform for games is just an awkward phase. When your kids hear about the next generation of Sega Genesis and Super Nintendo, they'll be heading back to the twitch machines. And this time, the game unit alone will set you back \$200 to \$300. Get ready.

TAKE NOTE: 73 percent of computer buyers surveyed in 1994 admitted they owned a modem, but only 25 percent said they currently use an online service.



Source: Software Publishers Association's fourth annual study of computers in the home, 1995.

Hangin' at the Hub

If your kids are going through an awkward phase of their own, they might be glad to hear about *The Hub*. By the time you read this, it should have debuted on America Online. And it's targeted at young adults. AOL concelved the service in conjunction with New Line Television, and the two companies plan to offer entertainment, regularly scheduled programming, and a place to hang out with peers online. They also plan to sell "cool stuff you can't get elsewhere." The question is, are they hip enough?



By Christina Wood

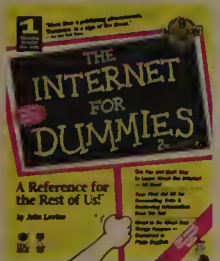
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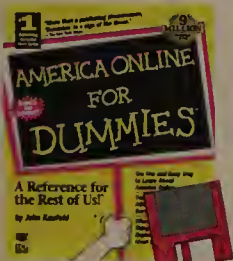
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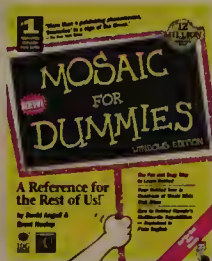
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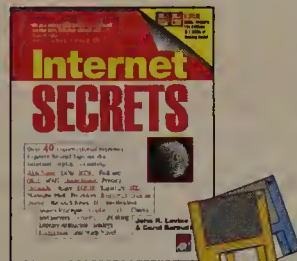
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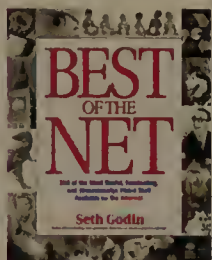
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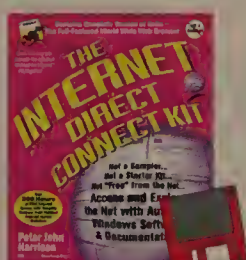
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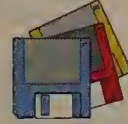
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VIRTUAL EATS



Does someone with 30 cookbooks really need another on CD-ROM? I had doubts. But after trying the MasterCook Silver Platter Cookbook, I want it. It includes over 600 recipes by the California Culinary Academy, and the selection shows imagination and breadth. You can search for recipes by ingredient, preparation time, percentage of calories from fat, and other criteria. You can also enter your own recipes and get a nutritional breakdown by serving. A glossary defines techniques and terms. Find out what agar-agar is, or learn what the verb *chow* means. I can't say I was tempted by the pictures, though. The artichoke savories, for example, looked like a stack of blue-green linoleum tiles. —*Peggy Nauts*

MasterCook Silver Platter Cookbook
\$39.95; Arion Software; 800/444-8104,
512/327-9573. Grade: **B+**
Reader service no. 760

FAMILY WAY



A.D.A.M.: The Nine Month Miracle serves as a fascinating guide through that no-turning-back adventure: pregnancy. The program opens with detailed anatomical illustrations. But click on *Family Album* and you get a tour of everything from the microscopic details of reproduction to the impact on life and family—from the perspective of

Adam, Eve, and their doctors. Kids will enjoy A Child's View of Pregnancy, in which 7-year old Emily explains why her mommy's tummy looks that way. My only complaint is the hokey humor. A discussion of the fetus swallowing urine in amniotic fluid, for example, draws this knee-slapper from the father: "I sure hope he doesn't develop a taste for it." —*Bronwyn Fryer*

A.D.A.M.: The Nine Month Miracle \$49.95;
A.D.A.M. Software; 800/408-2326.
Grade: **B**
Reader service no. 761

TENDING THE GARDEN



The Garden Encyclopedia is an accessible guide for gardeners unclear on the difference between annuals and perennials. But it might prove disappointing to the savvy gardener prone to midnight snail-hunting raids. The meat of the piece is an A-to-Z plant guide where you can search for plants by Latin or common names or such specifics as height, flower color, and light requirement. Unfortunately the list of plants is paltry; for an encyclopedia claiming to cover everything, from herbs and vegetables to flowers and shrubs, it doesn't have much variety. —*Heidi Wolff*

Garden Encyclopedia \$49.95; Books That Work; 800/242-4546, 415/326-4280.
Grade: **C+**
Reader service no. 762

ELMO AND THE GANG



Early reading and spelling programs are a dime a dozen, so I was skeptical about Sesame Street: Let's Make a Word, a new CD-ROM for kids ages 3 to 6. But I like it. With the help of Guy Smiley and a cast of other familiar *Sesame Street* characters as guides, kids explore a playground, a con-

struction site, a restaurant, and a farm. Each place includes dozens of hot spots; click on them for fun animations and word play. The activities vary, depending on the guide. Elmo pronounces and spells words, Big Bird helps with sounds, Rosita says each object in Spanish. There are six characters, and each encourages kids to play a different word game. —*Roberta Furger*

Let's Make A Word \$49.95; Creative Wonders; 800/245-4525. Grade: **B+**
Reader service no. 763

BATTER UP



Cruising the Microsoft Complete Baseball Guide's league and franchise almanacs, multimedia galleries of great moments, and tough Trivia Quiz questions is akin to browsing simultaneously through a Bill James abstract, the Ken Burns historical PBS series, and the world's biggest baseball card collection. It's an elaborately cross-referenced labyrinth of player stats and bios delivered via amicable buttons, list filters, and hot text. The 1995 version triples the previous number of video clips, beefs up the statistics and team coverage, and adds a Ballpark section complete with seating charts, ticket info, food ratings, and city maps. If petty bickering between owners and players puts the game on hiatus again, this title could pinch-hit as reliably as Manny Mota. —*Derk Richardson*

Complete Baseball Guide \$49.95;
Microsoft; 800/426-9400.
Grade: **A**
Reader service no. 764



Men Are From Mars: Our therapist digs it.

NEXT MONTH

Look for *PC World's Home PC Scorecard* in this section starting in September. We'll examine the factors that matter when you're buying a home PC, and we'll grade the systems that make it through our tests. We'll also run home PCs through our rigorous Top 20 benchmark tests, see how they handle popular multimedia titles, rate them on user interface and ease of setup, and look into the companies' reputations for service and reliability. Each system will get a grade on each factor, so you can decide which computer is right for your home.

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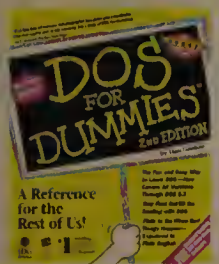
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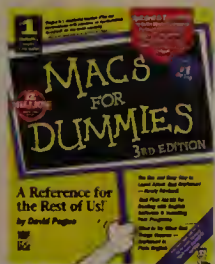
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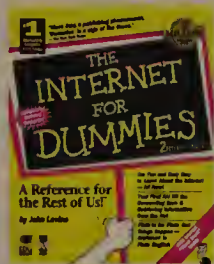
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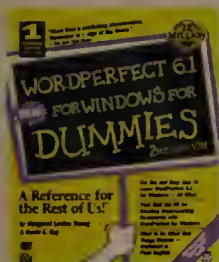
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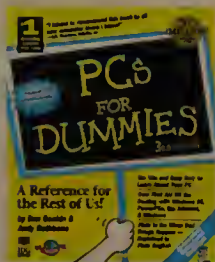
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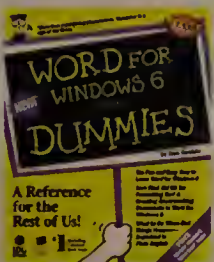
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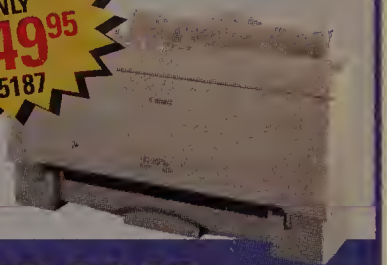
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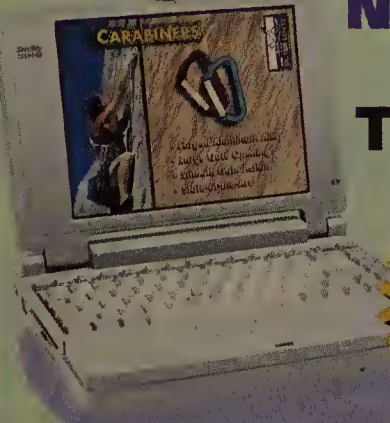
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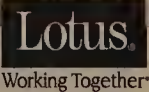
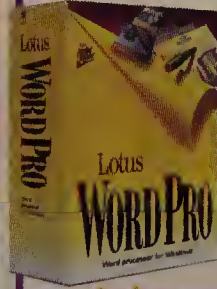


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Your Children's Homework, Your Computer

What to do when the report is due and the library is closed.

BY LINCOLN SPECTOR

School papers were harder when I was a kid. You had to open a hardbound encyclopedia, locate your topic, and laboriously copy every word by hand. Then you prayed your teacher didn't have the same encyclopedia.

Today you can use a PC to search digital encyclopedias and copy and paste your plagiarism into a word processor. No hassles.

Now that you're an adult, though, you probably don't want *your* kids to cheat. You'd rather drag them kicking and screaming into good study habits. Believe it or not, your computer can help here, too.

First and foremost, don't let that budding scholar depend on just one source of information. After all, kids who see only one point of view grow up to be politicians or

computer journalists. My wife and I insist that our son use at least two sources on any research project. It makes his life miserable, but at least he gets good grades.

THE ONLINE LIBRARY

There are lots of online sources your kids can turn to, such as the World Wide Web and CD-ROM encyclopedias, but the best is a corner of Prodigy called Homework Helper. Here you get your multiple sources in one convenient (if expensive) place.

Basically, Homework Helper is a

searchable collection of over 700 reference works and publications, many useful. It has newspapers ranging from the *Abya Yala News* to the *Ukrainian Weekly* (overlooking the *New York Times* and *Washington Post*), magazines, maps, television transcripts, and books. These include *Compton's Encyclopedia*, with the same text as the CD-ROM but without the sounds, animations, videos, or Patrick Stewart narration. Homework Helper has its own user interface, which is much nicer than Prodigy's.

How does it work? Do a search for Albert Einstein, and you'll get a list of 150 items: articles from the *Bulletin of the Atomic Scientists* and the *New Republic*, a chapter from *History of the World*, 36 *Compton's Encyclopedia* entries, and 6 reviews of the movie *I.Q.* Like I said, plenty of sources.

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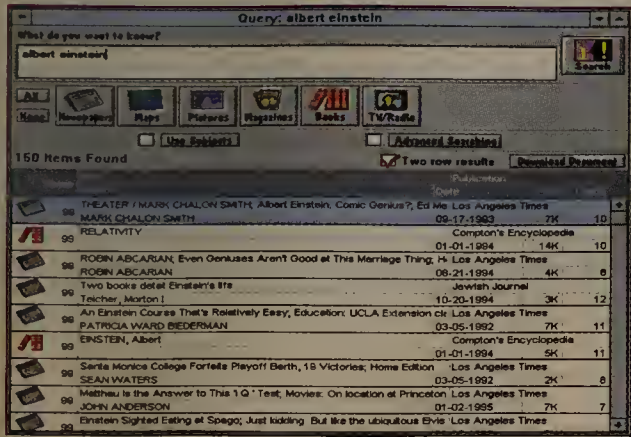
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Helpful Hints



Homework Helper's assorted choices.

than 150 items, which is plenty—if they're the right 150. To make that more likely, it's a good idea to narrow searches with queries like *Where was Albert Einstein born?* You can also restrict a search to certain types of sources (newspapers) or particular sources (*Los Angeles Times*), or by date or author. It's all pretty easy to figure out.

Homework Helper is like a quality university—it costs a fortune. Either a flat \$6 an hour, or \$9.95 a month plus \$2.95 an hour after the first 2 hours, all on top of Prodigy's regular fees. That can add up to a

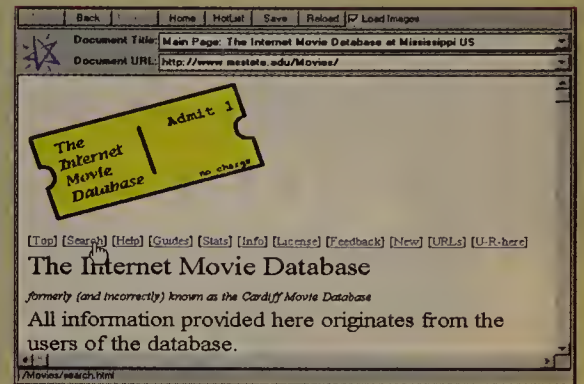
lot of money—especially if your kids read article after article online. To make matters worse, there's no on-screen clock to remind your little prodigy how much this is costing Mommy and Daddy.

So make sure the kids follow these money-saving rules: After a search, scan the resulting list of items and double-click only the promising ones. Homework Helper brings the article up in a window. Instead of

reading it, select *File • Save* to store it as an ASCII text file for offline study. If your children can't follow these steps, show them how a spreadsheet can calculate smaller allowances.

One final warning: On my own system Homework Helper developed a taste for logging off without warning, causing frustration, tantrums, and immature cursing. But my son took it a bit better than I did.

Lincoln Spector is a PC World senior associate editor.



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Automation Comes Home

Turn out the lights at ten-thirty—without lifting a finger

BY STEVE BASS



Every third Saturday—the day my wife Judy gets up at 5 a.m. to go birding—the heat automatically turns on at 4:30 a.m. At 5, the hallway light comes on at half brightness. And at 5:15, both the kitchen light and the coffeemaker come on. What makes this happen? A few inexpensive whizbang electronic gadgets, cheap software, and my computer.

At the heart of this lifestyle is a \$50 gadget called a CP290. (Hey, no one thought C3PO was a friendly name, either.) You connect the CP290 to your computer's serial port, download instructions to it, then disconnect it from the computer and plug it into the wall.

NOTHING UP MY SLEEVE

The CP290 transmits its signals through your house's power lines, but there has to be something more intelligent than the bedroom lamp to receive them. That's where your collection of X-10s come in. (Don't you just love these catchy names?)

An X-10 isn't a fighter plane, but a little doohickey you plug into a wall socket. You

assign each X-10 a code number by setting its dial, then you plug a lamp, TV, or whatever into it. You may leave that lamp switched on, but it's not going to get any electricity until the CP290 gives the X-10 the signal (or you turn the X-10 on manually). A variety of X-10s are available in the \$12 to \$15 price range, some handling as much as 500 watts and others specializing in dimming lights.

A company called X-10 USA makes both the CP290 and various X-10 models. Many outfits make X-10

clones, and as far as I know, they're as good as the originals. You can find these gadgets at electronics stores and mail-order houses.

THE SOFT TOUCH

When you buy the CP290, you also get Lighthouse for Windows, a program for setting up your schedule. Lighthouse lets you give descriptive titles to specific lights and appliances and schedule simple and complicated events. For example, you can group all the outdoor lights as one event, making them come on together at specified or random times. You can also save setups for winter, summer, or vacations and load them when needed.

Once you get cooking, you'll want to try other CP290 software—there's a lot around, mostly shareware. My favorite is Plato for Windows, a commercial package that helps me create intricate blueprints of the entire house, room by room, with icons for lamps, TV sets, and so on. You can try a free demo version, available as `pfwdem.zip` on PC

World Online. The best place to look for shareware, and to converse with other X-10 users, is CompuServe's Consumer Electronics forum (go `cegeneral`).

TAKING THE PLUNGE

It's best to start small, with just a CP290 and a few X-10 modules. You can add more as you go along. You should also pick up some manual controllers; that way, you can turn on the lights on the other side of the house if you hear a noise. You can buy a generic controller for about \$11.

When you're really hooked, you can install some X-10 wall switches, which let you control outdoor and overhead lights. I know it sounds a bit intimidating, but I replaced four switches on a Saturday afternoon with little trouble. If you prefer, you can always hire an electrician.

There's a ton of more sophisticated stuff you can graduate to, such as connecting your sprinkler system, burglar alarm, and thermostat to X-10s. There's even a module to fire up a hot tub so it's ready for you after a long commute. Now all I need is a hot tub and a long commute.

• **CP290, X-10 modules** \$69.99 and \$14.99 respectively; X-10 USA, Inc.; 201/784-9700, 201/784-9464 (fax)

Reader service no. 742

• **Plato for Windows** \$49.95; Home Automation Systems Inc.; 800/762-7846, 714/708-0610, 714/708-0614 (fax)

Reader service no. 743

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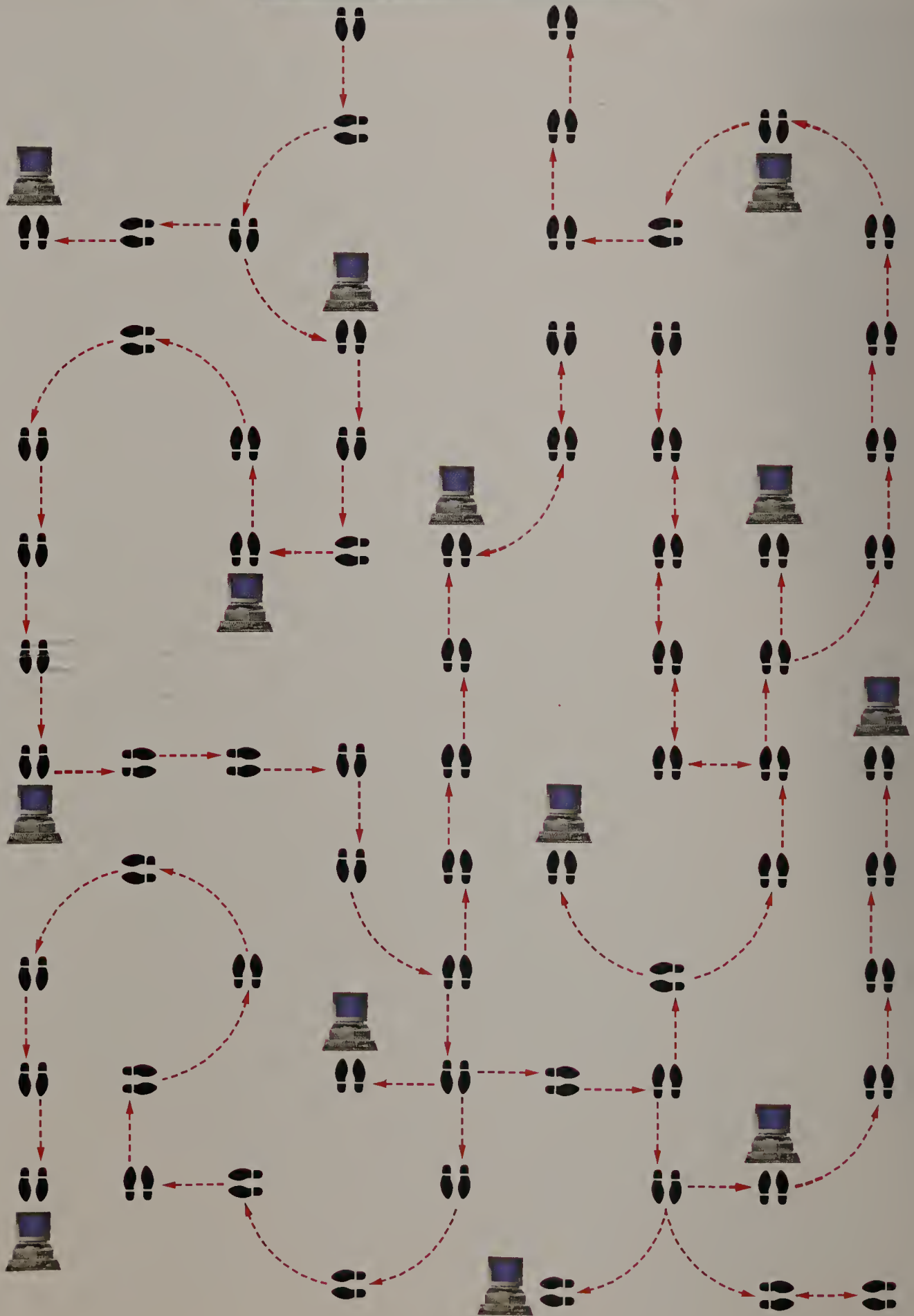


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